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Editorial

The Port of Stettin.

In this month's issue we publish two articles on the Port of Stettin, Germany's chief port on the Baltic Sea. The first article is contributed by Dr. Ernst Oldenburg, and describes the history of the harbour of Stettin from its early days, and the second article concerns Stettin's considerable decrease in trade in recent years with the Eastern provinces of Europe, owing to the new Polish frontier, and for which we are indebted to Dr. Krohne, the German Minister of Transport.

Stettin, which is situated on the River Oder about 65 kilometres from the mouth of the river, is to-day the third greatest port in Germany and is also the largest German port on the Baltic Sea. Owing to its geographical position and its close proximity to Berlin, which is only 135 kilometres distant by rail, Stettin is an ideal traffic centre for goods being shipped to Eastern Europe.

The first construction of any description for the purposes of a harbour was commenced in 1843, from which year developments were undertaken at various intervals until, in 1894, it was decided to construct a new harbour together with a free port, and these works were completed in 1898.

The Free Port has a total area of 60.82 hectares, of which 22 are water. The northerly waterways of this section are divided into two basins, each being 100 metres wide and circled by a massive walled quay, which has a total length of 4 kilometres. Warehousing accommodation in the Free Port comprises six large warehouses on the quay, to which have recently been added a new warehouse which is 210 metres long and 37 metres wide, this being a six-storey building. It is built of reinforced concrete and has available area for warehousing of 47,000 sq. metres, and 65,000 tons of goods can be stored there. Eight luffing cranes are provided on the quay for the purpose of transhipment, while overhead cranes mounted on the roof carry out loading and unloading.

The Free Port is well equipped with mechanical facilities, as over 100 cranes are available, some hydraulic and some electric, with a lifting capacity up to 40 tons, and floating cranes, etc., are also available.

Another section of the port is devoted to the bulk goods trade and is known as the Reiherwerderhafen. Amongst the goods dealt with are ore, phosphates and coal, for which purposes there are available four overhead cranes, each with a lift of 5 tons, three 15-ton cranes and a coal hoist which is capable of discharging a truck of coal every three or four minutes. The 15-ton overhead cranes are able to take any rough and lumpy ore direct from the hold of the ship from which it is put into travelling bunkers equipped with automatic scales, and thence into the goods trucks.

There is another section of the harbour which is devoted to industrial undertakings and this is well equipped with railway facilities for conveying goods to the various harbour basins.

The goods traffic handled at the Port of Stettin has decreased considerably in recent years, and the figures for 1931 show a decrease of nearly 2,500,000 metric tons on those for 1913, the figures being:—1913 traffic handled, 6,245,538 metric tons, and those for 1931, 3,767,162 metric tons. There is a decrease of over 1,100,000 metric tons for the year 1931 as compared with 1930, the figures for the latter year being 4,888,130 metric tons.

The Port of Stettin also forms the supplement for this month's issue.

Suggested Tyne Improvement Commission Bill.

The Tyne Improvement Commission at its meeting in the latter part of July approved a report of the Parliamentary Committee that application be made to Parliament for authority to amend and extend the powers of the Commissioners. Among the powers sought will be the provision to extend the period of office of representatives of local municipal authorities on the Commission from one year to three years; power to extend the definition of the word "vessel" to include motor ships, seaplanes, hydroplanes, and similar craft, to enable the Commissioners to exercise greater control over the foyboat service, and power to secure release from the statutory obligation to maintain the direct and Whitehill Point Ferries between North and South Shields. There will be consultations between the Commissioners and the Tynemouth and South Shields Corporations before the Bill is deposited.

Freight rates from Scottish Ports to English Ports considered too high.

An interesting discussion concerning the question of freight rates from Scottish ports to English ports ensued at a recently-held meeting of representatives of the Scottish Chambers of Commerce held at Edinburgh. Initiating this discussion a representative of the Edinburgh Chamber urged that high shipping freights on goods from Glasgow to London and to the south-west of England were a serious handicap to Scottish trade. A statement of comparative rail and sea freights from Glasgow showed, for example, that the freight between Glasgow and Antwerp was about half that to London. Another speaker said that shipowners had to sell transport, just as a manufacturer sold a manufactured article, for the best price it would fetch. The rate quoted must depend on the quantity of goods available to be carried, the regularity of the traffic and on many other circumstances. Quoted rates to English ports were not strictly comparable with rates to Continental ports; the former often included wharf dues and cartage, whilst the latter were bare c.i.f. rates. If business men who had large quantities of material for shipment would consult with the shipowner (added this speaker) the best possible freight rates would be quoted. After a further interchange of opinion it was agreed that this matter should be further discussed by the Edinburgh Chamber of Commerce.

Shipping at Italian Ports.

During the first six months of 1933 the total amount of cargo arriving at and leaving Italian ports amounted to 15,500,000 tons of goods, of which 63 per cent., or 9,840,000 tons were carried in Italian bottoms and 37 per cent., or 5,660,000 tons in foreign bottoms.

During the same period of the preceding year the total cargo amounted to 15,025,000 tons, of which 9,118,000 tons, or 61 per cent., was transported by Italian vessels and 5,907,000, or 39 per cent., by foreign vessels.

There has, therefore, been an improvement in the current year in comparison to 1932 of 475,000 tons, or 30 per cent. in the total cargo traffic, with an increase of 722,000 tons, or 8 per cent. for the Italian flag and a falling off of 247,000 tons, or 4 per cent., for goods transported by foreign vessels.

The Italian share of the total internal traffic for the first six months of 1932 was 97.4 per cent., compared to 96.9 per cent. in 1933, while for Mediterranean traffic it fell from 79.9 in 1932 to 74.1 per cent. in 1933, but rose from 38.7 to 40.5 per cent. for the traffic beyond the Straits.

The total of cargo transported in June, 1933, marks an increase of 1.63 per cent. over the figures for the same month of the previous year, with an increase of 4.78 per cent. of the share falling to the Italian flag and a decrease of 4.52 per cent. of the cargo carried under foreign flags.

During the month of June, 1933, the participation of the Italian flag in internal traffic rose from 97.6 per cent. (in 1932) to 98.1 per cent.; as regards Mediterranean traffic, it fell from 82.5 to 76.4: while with regard to traffic beyond the Straits, it rose from 43.9 to 46.4 per cent.

Italian Harbour Affairs

The construction of the Littorio Dock in the Port of Naples.

ACCORDING to statistics which have just been published by the Istituto Centrale di Statistica, shipping at Italian ports during the month of July, 1933, included the arrival of 21,028 ships representing a total of 7,549,305 n.r.t. and carrying 2,052,791 tons of goods and 399,297 passengers against the arrival of 20,400 ships, 6,849,000 n.r.t., 1,829,000 tons of goods, and 435,000 passengers during the corresponding period of 1932, and the clearance of 20,193 ships, 7,421,311 n.r.t., 721,538 tons of goods and 371,382 passengers, against 20,400 ships, 6,759,000 n.r.t., 670,000 tons of goods and 409,000 passengers cleared during the month of July, 1932. Shipping at Italian ports has continued to increase since the month of June, and taking into consideration the improved condition of the economic situation in this country, there is reason to believe that this progress will continue in the next few months.

No detailed statistics have been published as yet for traffic at the various Italian ports during the month of July, but the figures regarding shipping at various Italian ports during the first six months of 1933 are as follows:—

January—June	No.	ARRIVALS AND CLEARANCES N.R.T.	Goods unloaded (Tons)	Goods loaded (Tons)
SAVONA				
1933	1,609	1,460,477	717,576	138,343
1932	1,322	1,205,458	674,108	112,786
1931	1,232	1,142,285	705,584	105,242
1930	1,135	1,171,038	857,293	123,082
1929	1,047	1,023,761	868,350	44,429
1928	798	696,145	693,770	40,132
GENOA				
1933	5,779	9,752,279	2,614,859	565,455
1932	4,435	9,113,966	2,508,897	455,103
1931	4,644	9,740,364	2,945,726	430,141
1930	4,945	9,984,584	3,121,820	454,084
1929	5,374	10,193,349	3,591,970	517,119
1928	5,040	9,562,313	3,500,501	444,310
LEGHORN				
1933	3,747	3,785,908	567,609	193,228
1932	3,451	3,693,367	574,793	178,730
1931	3,321	3,579,077	566,354	181,657
1930	3,581	3,644,823	798,922	219,921
1929	3,575	3,229,072	811,233	180,949
1928	3,209	3,239,777	797,178	198,514
NAPLES				
1933	9,961	9,330,930	714,561	136,235
1932	9,385	10,306,000	812,952	149,519
1931	9,456	10,444,291	906,952	173,488
1930	9,149	10,129,031	903,752	166,496
1929	8,869	10,097,121	1,011,770	156,791
1928	8,609	9,229,214	1,063,013	143,162
BRINDISI				
1933	1,430	2,515,886	67,332	13,293
1932	1,176	2,484,193	52,227	4,621
1931	1,278	2,165,809	64,457	6,274
1930	1,174	2,143,807	49,877	7,541
1929	1,104	1,898,788	29,943	6,308
1928	1,078	1,686,052	40,520	5,597
BARI				
1933	1,614	1,558,724	108,985	22,748
1932	1,698	1,492,868	187,442	22,400
1931	1,666	1,416,588	161,505	29,179
1930	1,646	1,341,190	160,552	32,340
1929	1,838	1,314,831	173,886	39,036
1928	1,874	1,226,024	195,218	27,121
ANCONA				
1933	2,178	1,406,875	130,644	54,887
1932	1,857	1,297,008	159,703	26,345
1931	1,940	1,138,857	228,534	32,664
1930	3,046	1,269,789	350,387	30,579
1929	2,377	1,214,394	267,057	38,376
1928	2,439	1,424,415	423,031	13,999
VENICE				
1933	3,780	4,564,096	1,070,622	246,182
1932	4,057	4,680,485	1,147,093	212,356
1931	3,437	3,929,377	1,084,323	240,515
1930	3,506	4,120,103	1,178,804	226,843
1929	3,806	3,987,080	1,215,143	196,609
1928	3,201	3,702,799	1,200,399	129,182

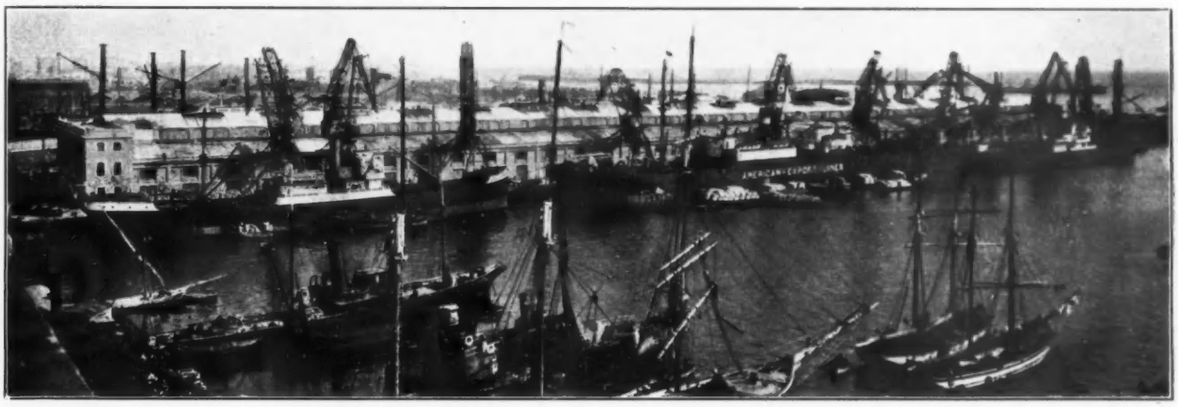
January—June	No.	ARRIVALS AND CLEARANCES N.R.T.	Goods unloaded (Tons)	Goods loaded (Tons)
TRIESTE				
1933	15,666	5,118,712	690,722	251,588
1932	15,907	5,259,845	856,718	273,243
1931	15,263	4,797,826	798,041	328,031
1930	16,341	4,886,256	826,062	410,015
1929	14,222	4,920,068	1,090,922	432,984
1928	14,084	4,615,807	870,454	383,026
FIUME				
1933	5,341	1,900,732	178,463	77,652
1932	5,240	1,937,380	121,916	89,300
1931	5.712	2.109,077	168,141	108,890
1930	6,090	2,528,386	241,270	166,636
1929	5,659	2,408,217	238,962	165,691
1928	5,826	2,325,772	256,309	182,704
PALERMO				
1933	3,403	3,430,671	226,886	93,535
1932	4,924	3,331,900	205,265	73,214
1931	4,461	3,720,319	271,356	91,589
1930	2,297	3,154,143	315,474	99,930
1929	2,887	3,146,223	317,063	82,559
1928	3,960	3,374,644	347,686	96,221

An increase has been particularly noticeable at Genoa, while there has been considerable improvement in connection with exports from certain ports, such as Savona and Leghorn. The satisfactory situation of shipping at Genoa is also apparent from the fact that the tonnage drydocked at Alle Grazie Docks of the S.A. Ente Bacini during the first six months of 1933 has reached 1,259,435 gross tons against 1,261,551 gross tons during the corresponding period of 1932, a decline of 2,000 gross tons.

In the course of the general meeting of the Consorzio Autonomo del Porto di Genova, the President, Marquis Negrotto Cambiaso, after having announced that arrangements had been made with the Italian State Railways Administration to increase the Swiss transit trade through Genoa, particularly as far as cereals and aluminium are concerned, pointed out that 11,000 metres of new quays are being added to the old facilities in the port of Genoa, and this progress involves the necessity of settling several problems, among which may be mentioned the construction of a railway to Piacenza, the organisation of the truck services coming from the hinterland and unloading directly in the port, the transformation of the Calatimbar Co., which was created for the purpose of handling goods shipped, the reorganisation of labour and tariffs, and finally the question of the operation of the new harbour facilities. Considerable importance is attached to these problems, and while in certain quarters it is insisted that the Harbour Board should undertake the operation of the harbour facilities as a whole, in other quarters it is suggested placing the various piers and quays of the Victor Emanuel Dock and of the Mussolini Dock at the disposal of the Italian steamship companies, who should operate them on their own account. It is considered that the general cargo trade should be transferred from the old port of Genoa to the Mussolini dock.

Important developments are also taking place at Naples, with the construction of the new dock towards the eastern part of the old port of Naples, and the construction of a new breakwater 343 metres in length along the entrance of the San Vincenzo Mole. This breakwater has been completed, and it is interesting to note that the concrete blocks which have been used for its construction weighed 416 tons each. The breakwater has a wall measuring 7.90 metres in height with a quay 4.90 metres in width. The breakwater sheltering the Littorio Dock has been lengthened by 400 metres, and this work has been completed. Furthermore, the Carmine Pier (formerly Masaniello Pier) has been lengthened by adding 1,350 metres of quayage with a width of 50 metres. In consequence the quayage of the old port of Naples has been increased by 400 metres with a depth of water of 10.50 metres and 17,000

Italian Harbour Affairs—continued



Port of Naples—Carmine Pier with concrete warehouses.

square metres of ground for warehouses, etc. On the above-mentioned ground warehouses of the Societá Anonima Docks Meridionali have been erected, occupying an area of 10,560 square metres and served by electric cranes having a capacity varying from 1.5 tons to 3 tons. The Victor Emanuel II. pier has been enlarged by the construction of quay walls along the eastern side of the pier over a length of 352 metres, with a width of 40 metres. The Vigliena mole has also been extended a distance of 250 metres with a width of 100 metres. The quayage in the port of Naples has been increased by 2,000 metres, to which has to be added the new quayage resulting from the enlargement of the Victor Emanuel II. and the Vigliena quays, 602 metres, making 2,602 metres in all.

Among the most important constructions of quay walls undertaken in the port of Naples may be mentioned those on the first two sections of the Molo Angioino, on which the maritime passenger staton will be built; the quayage on the second section measuring 300 metres in length is to be completed within the next few weeks. Works completed comprise the head of the Molo Angioino, measuring 120 metres in length, a quay built towards the Sacramento dock and measuring 420 metres in length, and finally a quay between the Angioino Mole and the Immacolatella Vecchia Pier measuring 310 metres in length. The old General Bonded Stores and the lighthouse situated on the Molo Angioino have been demolished, and the resulting space will be utilised for the maritime passenger station, for which tenders have already been invited. Six electric cranes of 1.5 tons and 3 tons are being fitted on the lumber trade quay. In addition to the above-mentioned works, the fitting out of the concrete warehouses on the Porta di Massa quay has been completed. These warehouses are connected by means of four aerial conveyors, each of which can carry 600 bags of a weight of one cental each per hour. Three cargo lifts, of a capacity of 1.5 tons each, have been fitted in the second concrete warehouse on the same Porta di Massa quay.

Concerning the construction of the large dry dock at Naples, this will, when completed, have the following dimensions:—Length, 321 metres; breadth, 40 metres; depth at entrance, 13 metres. The dry dock will be built so that it can be extended to a length of 400 metres if required.

The question of unloading facilities at Naples has been discussed, and it has been suggested that the four electric cranes of 3 and 5 tons which have to be removed from the Sacramento quay, in consequence of the construction of the maritime passenger station, should be transferred to the Victor Emanuel II. Pier. Furthermore, it has been suggested that, of the six new 1.5 tons to 3 tons electric cranes of the Ansaldo type, three should be placed on the first pier of the Littorio dock, two on the Molo Cesario Console, and one on the Victor Emanuel II. dock. Consideration has also been given to the purchase of two 5 to 10 tons electric cranes, which would be installed on a quay where large ships moor. Finally, it has been suggested that the port of Naples should be provided with a floating crane of 40 to 50 tons capacity.

New Dredgers being built on the Clyde

Welcome indications of some lifting of the industrial depression is provided by the placing recently of two contracts for dredging plant with the old-established firm of dredger builders, Messrs. Wm. Simons and Co., Ltd., of Renfrew. These orders form a gratifying addition to the small volume of shipbuilding work placed on the Clyde within recent months and are particularly welcome to Renfrew, which has been severely hit by the circumstances of the present times.

One is for a 27-ft. Cutter Suction Reclamation Dredger to the order of The Burmah Oil Company, Ltd.

This vessel is destined for river service in Burmah where, we understand, she will be employed on an extensive reclamation project which the owners have on hand. Work is to be carried out continuously on this project over a number of years and it is anticipated that the dredger will be operated on a 24-hours per day 3-shift basis.

Machinery of over 3,000 b.h.p. will be installed and the dredger will be designed to work to stern spuds and bow-swinging moorings. The suction frame will be long enough to dredge to 40-ft. depth of water and will be furnished with powerful rotary cutter gear for disintegrating the material.

The dredger will be equipped with two pumps of massive construction, arranged to work in series, and designed to deliver some 1,000 tons of solids per hour to an elevation of 38-ft. at the end of 1½ miles of floating and shore pipe line.

Each pump will be driven direct by a 6-cylinder Diesel engine of the 4-stroke single-acting solid-injection trunk-piston type. The cutter gear and other items of dredging machinery will be electrically driven, the supply being derived from a large Diesel-electric generating set, the auxiliaries will also be electrically driven and the equipment will include a stand-by Diesel-electric generating set. The hull is specially designed and strengthened throughout to cope with heavy pumping duty.

Owing to the large amount of sediment and vegetable matter brought down by the river a special closed-circuit cooling system will be installed. The engines will be cooled by clean fresh water, provision for a large bulk supply of which is made in the hull, and this cooling water will in turn be cooled by circulation of filtered river water.

Complete arrangements for overhauling all the machinery are being provided.

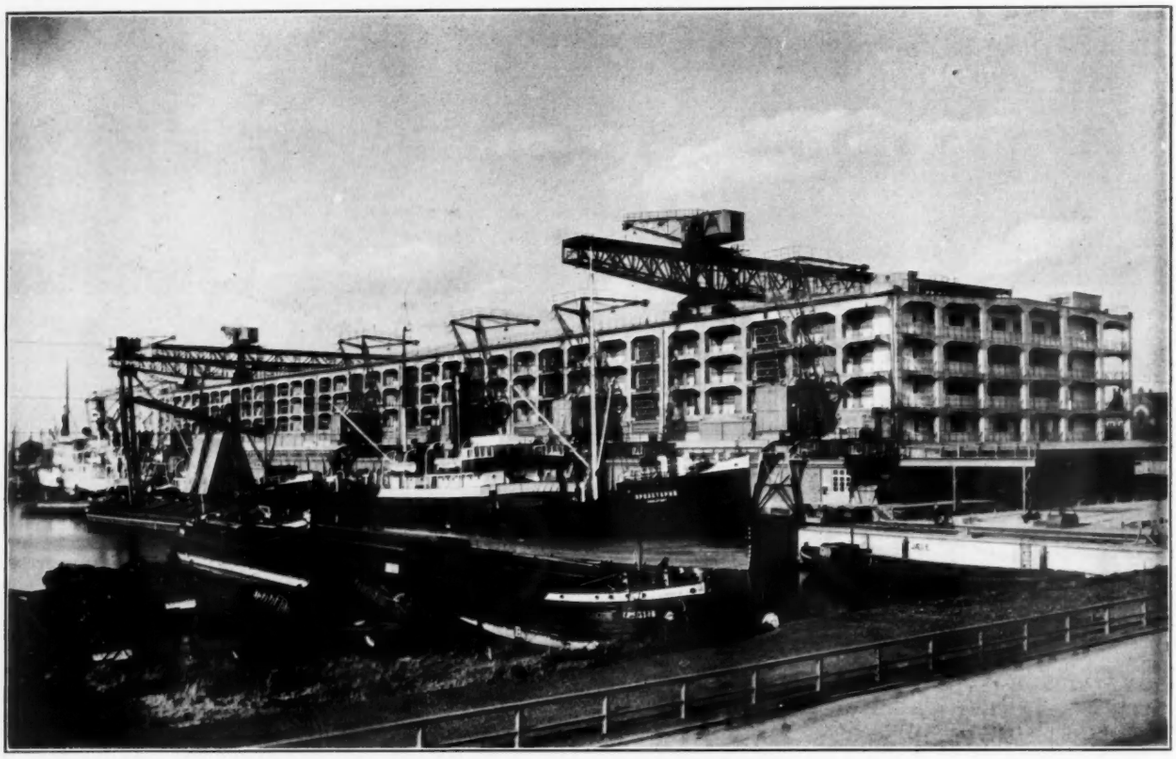
We believe this is the first large Diesel-driven dredger to be built on the Clyde, and indeed in this country, and Messrs. Simons are to be congratulated on their good fortune and enterprise in securing the order for this important development.

The firm have also received an order from the Chinese Purchasing Commission for a small steam-driven cutter suction dredger of their Patent Radial design, the special feature of which is that the hull is held stationary on three spuds while the disintegrating and suction mechanism is traversed to and fro across the desired width of cut. The forward spuds are equipped with rams by means of which the dredger is travelled forward to take successive cuts.

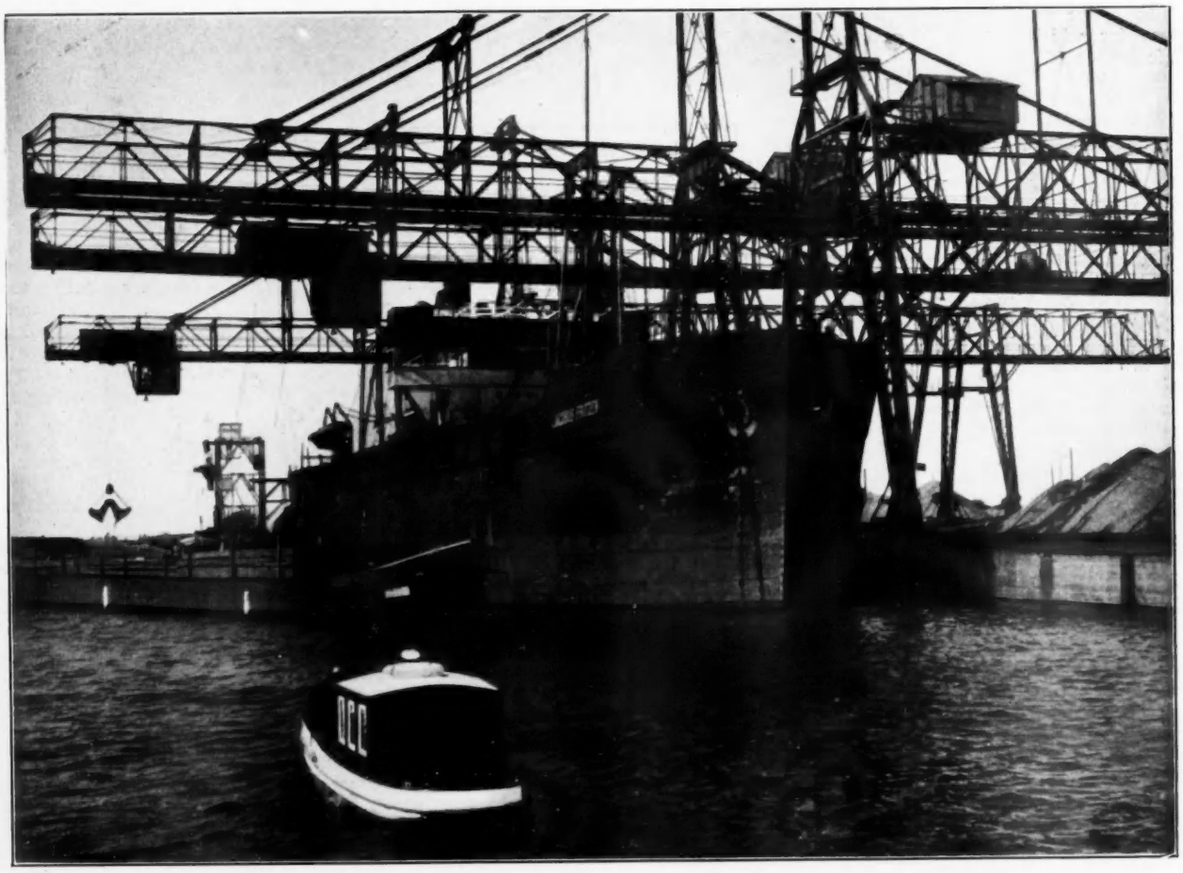
This type of dredger is particularly suited for work in narrow channels, as it is entirely independent of outside moorings.

We understand this contract is under the direction of Sir J. H. Biles and Coy.

The Port of Stettin



Largest Harbour Warehouse in Europe, 65,000 tons capacity.



Freeport of Stettin. View of part of the "Reiherwerderhafen" Bulk Goods Loading Wharf.

The Port of Stettin

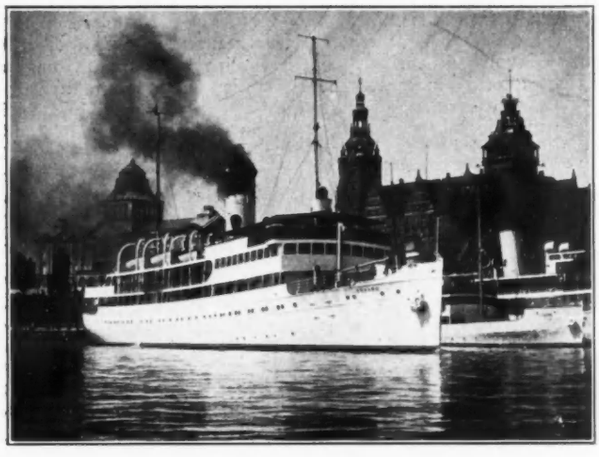
(Translated)

The Port of Stettin, which is situated on the River Oder, is the Third Greatest Port of Germany and the Greatest German Port on the Baltic Sea. It is ideally situated for handling traffic destined for Eastern Europe and at the same time is also the nearest Seaport to Berlin to be reached by rail, the distance being only 135 kilometres. We reproduce below two articles dealing with the Port of Stettin, the first one being a short history of the Harbour of Stettin by Dr. Ernst Oldenburg and the second article by Dr. Krohne, German Minister of Transport, describing Stettin's valuable position with regard to Eastern European Traffic.

Short History of the Harbour of Stettin

By DR. ERNST OLDENBURG

BEFORE the time of the railway it was sufficient merely to improve the river banks of the Oder in the town for the purposes of a harbour. The banks would be in parts strengthened with timber piles and provided with loading bridges, while along the river banks a row of private warehouses would arise. Account would be taken of the growing requirements from time to time by lengthening the existing quays without the general idea being altered. Stettin was debarred from this expedient, as development was restricted to very narrow limits owing to the walls of the fortifications (Stettin was a fortress until 1873).



Freeport of Stettin. At the Passenger Quay in front of the Hakenterrasse.

In 1843 the part of the Oder lying opposite the railway premises of Stettin was provided with railway connections as the first quay and so constituted the first loading quay in the modern sense of the word. Later in the years 1864 to 1869 arose on the right bank of the Parnitz, a tributary of the Oder, the central goods station, and in connection with this a massive quay wall 240 metres long with timber piling was constructed and provided with railway connections. After Stettin ceased to be a fortress in 1873 the harbour received a great increase in capacity through the so-called " Dunzig Promenade." Stettin on its part gave land to the extent of 23,555 square metres to form quays, while the railway company provided the buildings, together with crane and railway arrangements. The maintenance of the quays and the water passages between them was the responsibility of the town, while that for the buildings and for the crane and railway arrangements rested with the railway company. For this purpose the town received what was called a quay tax from vessels using the harbour and also a rent from the administration operating the traffic, i.e., the Directorate of the Railway Company, while the railway company received the revenue from transit dues as well as from crane and store charges. This arrangement was put into operation in 1878.

The growing trade, the ever increasing demands on the accommodation of the harbour, the construction of the Baltic-North Sea canal and the accommodation of the free ports of Hamburg, Bremen and Copenhagen forced Stettin to undertake the construction of centralised new harbour arrangements in conjunction with a free section. The works were taken in hand in 1894, and in the autumn of 1898 the inauguration of the completed free harbour followed. Since that time the traffic of Stettin Harbour has developed by leaps and bounds, so that the construction of a second basin—provided for in the original project—was taken in hand and put into service in 1910. The opening of the free harbour produced a change in the method of working, as the administration, which had so long been in the hands of the railway company, was taken over by the municipality and a special dock railway received the traffic from the existing State Railway at the harbour limits and conveyed it to the different docks.

A further important extension of the harbour accommodation must be mentioned, namely, the provision of an " Industrie " harbour which meets a definite traffic requirement. Stettin in the last years before the war became in an increasing way an industrial town, including amongst its activities the production of raw materials. Under pressure from the growing competition in all branches of business favourable developments of further industrial activity were only to be expected if the arrangements for this were withdrawn from the province of private enterprise and made secure for organised expansion and for later industrial development in the area.

After the war the operation of the harbour was extended by the provision of a special bulk goods quay equipped with loading bridges for hoisting and grabbing and a coal transporter. Unlike the free harbour, this dock—known as the " Reiherwerder " Harbour—was connected directly to the State Railway and not by means of the special dock railway.

Seaport of Stettin. Heavy crane at work, 65 ton lift.

Stettin developed from what was originally a small place of refuge in Hanseatic times until in the middle of the 19th century it became the largest German seaport on the Baltic, standing

The Port of Stettin—continued

third in the list of German seaports after Hamburg and Bremen. The main feature of the goods traffic of the Port of Stettin so far as the quantity is concerned, lies in the overseas traffic in bulk goods. Stettin also occupies a dominating position in East Germany in parcels traffic. Taking an average over the last year, about half the sea-going goods traffic was for Baltic ports, while the other half was sea-going traffic in the larger sense of the term. Liner traffic with Stettin includes communication with the whole of Northern Europe and also with the Mediterranean. Tramp steamers connect Stettin with all parts of the world. The following German provinces are included in the hinterland of Stettin: Pomerania, Brandenburg-Berlin, Saxony, Silesia together with Upper Silesia, as well as parts of Mecklenburg and the provinces lying further west and as far south as Bavaria. Outside the German frontier there are included parts of Poland, Czechoslovakia, Jugoslavia, Hungary and Austria; that is to say, the districts for which the Carpathian Alps act as a southerly traffic barrier.

On account of its rank among sea harbours in particular, Stettin must be counted among the great harbours. The reason why Stettin achieved this rank in spite of the increasing concentration of the sea traffic into a small harbour is due, firstly, to the favourability of its position in Eastern Europe with regard to traffic, and again to the outstanding concentration of traffic with the hinterland. Stettin harbour is only 135 km. from Berlin, the capital of Germany, and as a result has direct connection with the main line railway system of Germany. Further, the Oder gives cheap traffic facilities on the waterways as it, together with its tributaries and the systems of canals connecting it with the basins of the Elbe and Weichsel, is navigable for about 700 km. in a southerly direction, and this in competition with the railways ensures favourable railway freight facilities.

Stettin and the East

By DR. KROHNE, German Minister of Transport

Stettin constitutes an important focus for an investigation of the Baltic Coast, as the observations obtained there are not only valid for the immediate locality, but also for an extensive hinterland served by Stettin, that is, for the eastern provinces affected by the new Polish frontier. Harbours are not an end in themselves; they are rather the servants of trade. Generally speaking, as the trade of the eastern provinces collapsed, so did the traffic in Stettin Harbour decrease, while it remained far behind the recovery of traffic of the other German ports. If the latest traffic developments of the three largest German ports, i.e., Hamburg, Bremen and Stettin, are compared with those before the war, the following table is obtained:—

Overseas Goods Traffic (Imports and Exports taken together) amounted to

	1913 Million Tons	1931 Million Tons	1931 as Per cent. of 1913 Per cent.
In Hamburg	25·5	23·2	91
In Bremen	7·1	5·4	75
In Stettin	6·2	3·7	60

These figures show that all ports have suffered damage to their traffic as a result of the unhappy world war and the crisis that resulted immediately from it. No harbour, however, suffered so great a falling off of traffic as did Stettin. Stettin was formerly not only the largest German port on the Baltic Sea, but also the largest as compared with any non-German Baltic port. The originally sound basis of its traffic is shown clearly in the growing development before the war.

Goods Traffic Overseas before the war

1900 Million Tons	1905 Million Tons	1910 Million Tons	1914 Million Tons
3·2	3·8	4·8	6·2

The reason why the decline in traffic exceeds the average is to be found in the new non-economic German-Polish frontier which, as at present constituted, has proved itself to be a disaster, bringing great misery to large masses of people, and affecting adversely, not Germany alone, but the greater part of Europe.

Originally Eastern Germany formed a single trading unit, which was interlaced with a well-arranged network of traffic arteries. As a result of the unnatural dismemberment of this trading unit and its traffic arteries, the trade of Eastern Germany has been bleeding to death. Without consideration being given to their geographical inter-dependence as regards trade, the South-east European industrial areas and the centres of production of raw materials were divided up, and without regard to its vital importance to Germany the agrarian unit comprising the German corn-growing districts of the East was cut off, endangering the food supplies of the industrial, and therefore more populous West. The new frontier intersects the following: 68 railway lines; 144 main roads; 722 other roads.

There is in addition the damage done to the internal canal systems; for instance, to the Bromberger Canal, to the Netze and the Warthe, and also to the river system of the Oder with which the Weichsel connects. Just as a living body bleeds to death when the arteries are severed, so does the body of East German trade, which is affected by the breaking up of the mechanical basis of collective trade referred to above. How little these new frontiers have any relation to the relative growth of trade during the course of time is borne out by the fact that this frontier is taken directly through the smallest economic units, such as a small farm, a brickworks in the agrarian East, a mine or a factory in Upper Silesia.

It will therefore be readily understood that the trade of Stettin will be more seriously diminished than that of other German ports. Another factor which has seriously affected the position of Stettin as a seaport is the recent competition of Gdingen. Formerly there was no competition between the neighbouring harbours of the former East German coastal unit. Stettin, Danzig and Königsberg divided between themselves in a friendly manner the goods traffic of the East, and Stettin, thanks to its favourable geographical position, held the premier position. The possibilities of development of this German Baltic Sea port were so great that any kind of goods handling and storage which might be required could be carried out easily. As a result of the new frontier not only was the service area of this harbour diminished (this loss of territory was about 48,000 sq. km. from Eastern Germany alone, or about 68 per cent. of the total loss under the Versailles Treaty, which amounted to 70,580 sq. km.), but it involved the rivalry of the Polish harbour of Gdingen, which seriously increased the difficulties of the German Baltic ports. In order to procure traffic for this new port, for which there was no justification in the form of traffic ready to hand, Poland instituted transport "dumping," the intention of which was to divert transport to Gdingen from the districts which on account of their geographical situation should definitely be served by Stettin. This was brought about by lowering railway goods rates and other costs involved in traffic below the limits economically defensible on the actual costs.

Polish dumping of coal must be mentioned in connection with the transport rate-cutting by Poland, as this also means that the stability of European trade is in serious danger of being disturbed. Before the war Germany exported from Stettin and Danzig together only 0.12 million tons of coal, one-half of which was bunker coal which had to be supplied to the ships lying in the harbour. To-day, as the most valuable coal mines of Upper Silesia were transferred to Poland, the coal exports of Poland have risen (for the year 1931) to about 10 million tons, while Stettin, as before the war, only exports 0.11 million tons. This disturbance, which would affect above all the coal trade of England, is, when analysed, the result of unsound frontiers, which not only affect the economics of the Port of Stettin and those districts in the East which remain German, but also the harbours of Danzig and Königsberg, which are on the other side of the Polish tariff wall. This trouble in the East arising from the breaking up of frontiers and trade is a cancer on the management of affairs in Europe and a hindrance to the eventual recovery for which the nations of Europe are longing, Germany not least, suffering as she is as a result of the Treaty of Versailles.

It is obviously a deplorable truth and no exaggeration that much misery and unemployment have been evoked and that it must be the duty of all men working for the recovery of Europe to strive for a settlement.

The total amount of overseas goods traffic (imports and exports taken together) and the overseas coal exports of the Harbours of Stettin, Danzig and Gdingen in 1913 and from 1924 to 1931.

Weights in Metric Tons of 1,000 kg.

	STETTIN		DANZIG		GDINGEN	
Year	Total Goods Traffic	Coal Exports	Total Goods Traffic	Coal Exports	Total Goods Traffic	Coal Exports
1913	6,245,538	117,873	2,112,101	10,000	—	—
1924	2,731,431	14,511	2,374,557	40,812	9,717	9,086
1925	4,165,330	23,292	2,722,748	618,006	51,728	50,142
1926	5,786,972	2,174,486	6,300,301	3,415,948	414,005	402,246
1927	4,045,777	98,928	7,914,400	3,603,326	896,141	878,183
1928	4,596,959	1,451	8,473,500	5,428,551	1,956,020	1,758,232
1929	4,919,290	2,999	8,559,650	5,321,817	2,822,192	2,447,895
1930	4,888,130	25,784	8,238,000	5,380,000	3,623,000	2,952,400
1931	3,767,162	115,663	8,330,505	5,796,075	5,300,112	4,167,048

PORT OF STETTIN

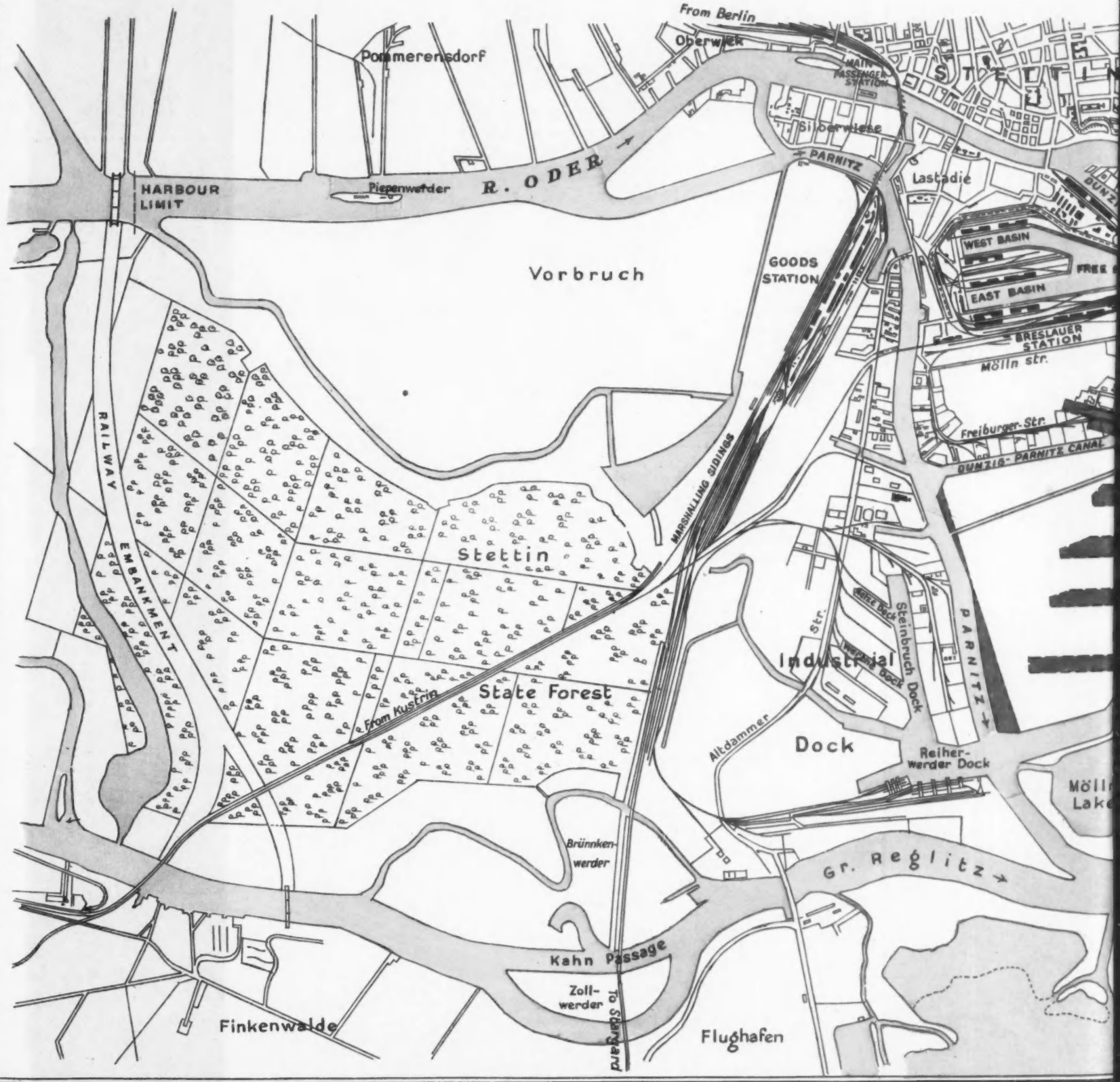
UNDER THE JURISDICTION OF THE STETTIN PORT ASSOCIATION L.TD

SCALE.

M. 500 0 2 KM

1 METRE = 3·28 FEET

NOTE;– Proposed New Water Areas coloured D.K Blue.
Water Areas to be Filled in coloured Red.



WARD & POKLOW, LITHO. HARCOURT ST. MARYLEBONE.

PLEMENT TO THE DOCK AND HARBOUR AUTHORITY, S

STETTIN

THE STETTIN PORT ASSOCIATION Ltd

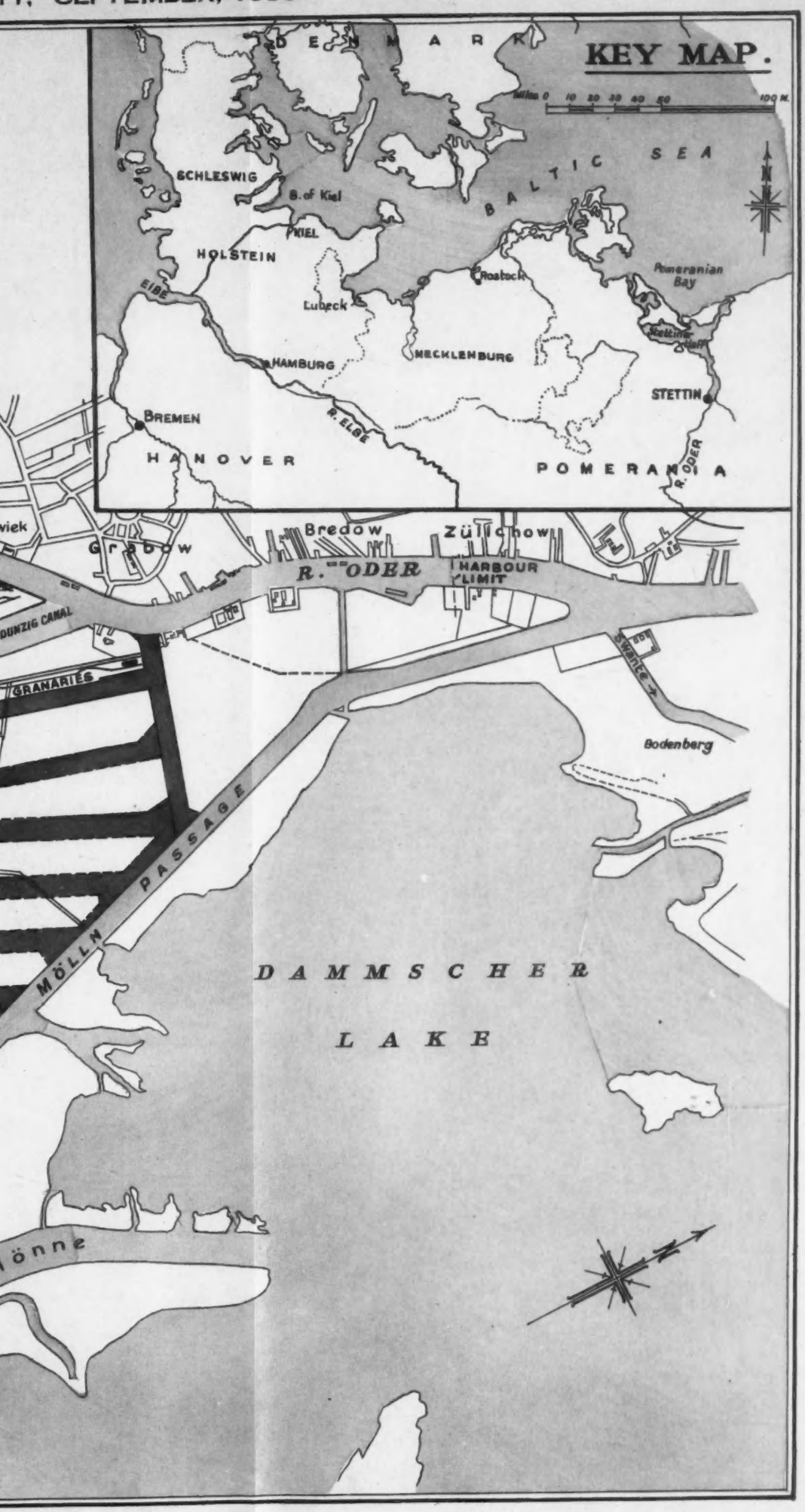
SCALE.

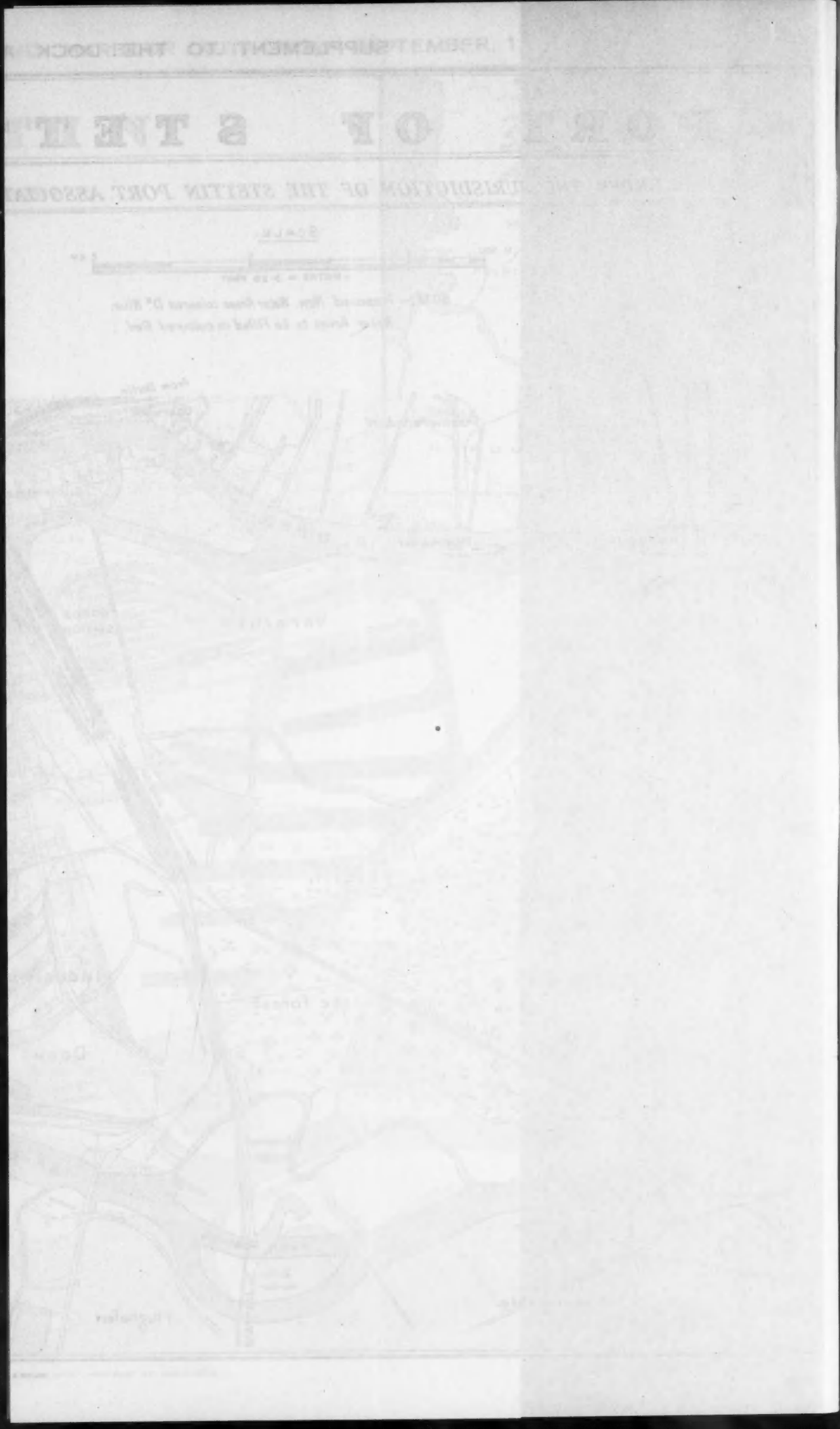
2 KM

METRE = 3·28 FEET

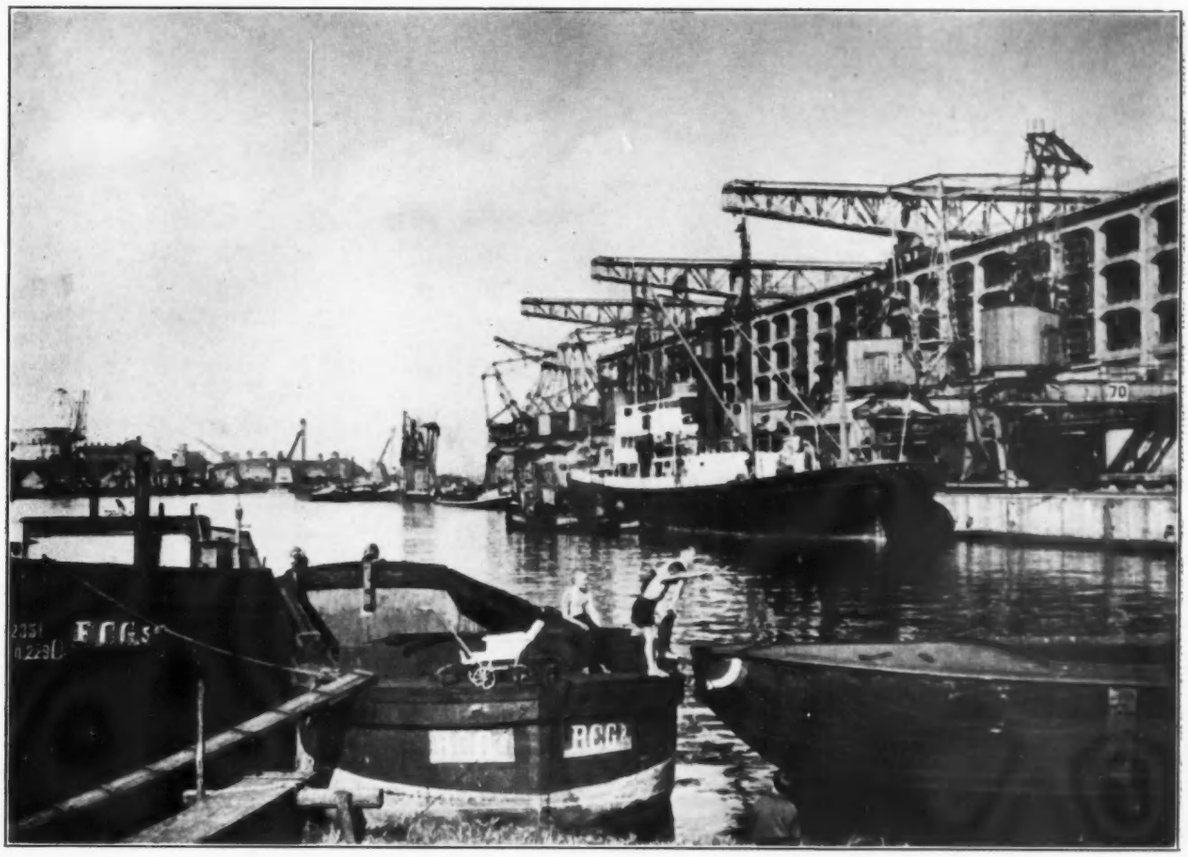
d New Water Areas coloured Dk Blue.
reas to be Filled in coloured Red.

WARD & FOXLOW, LITHO. HARCOURT ST. MARYLEBONE, W.

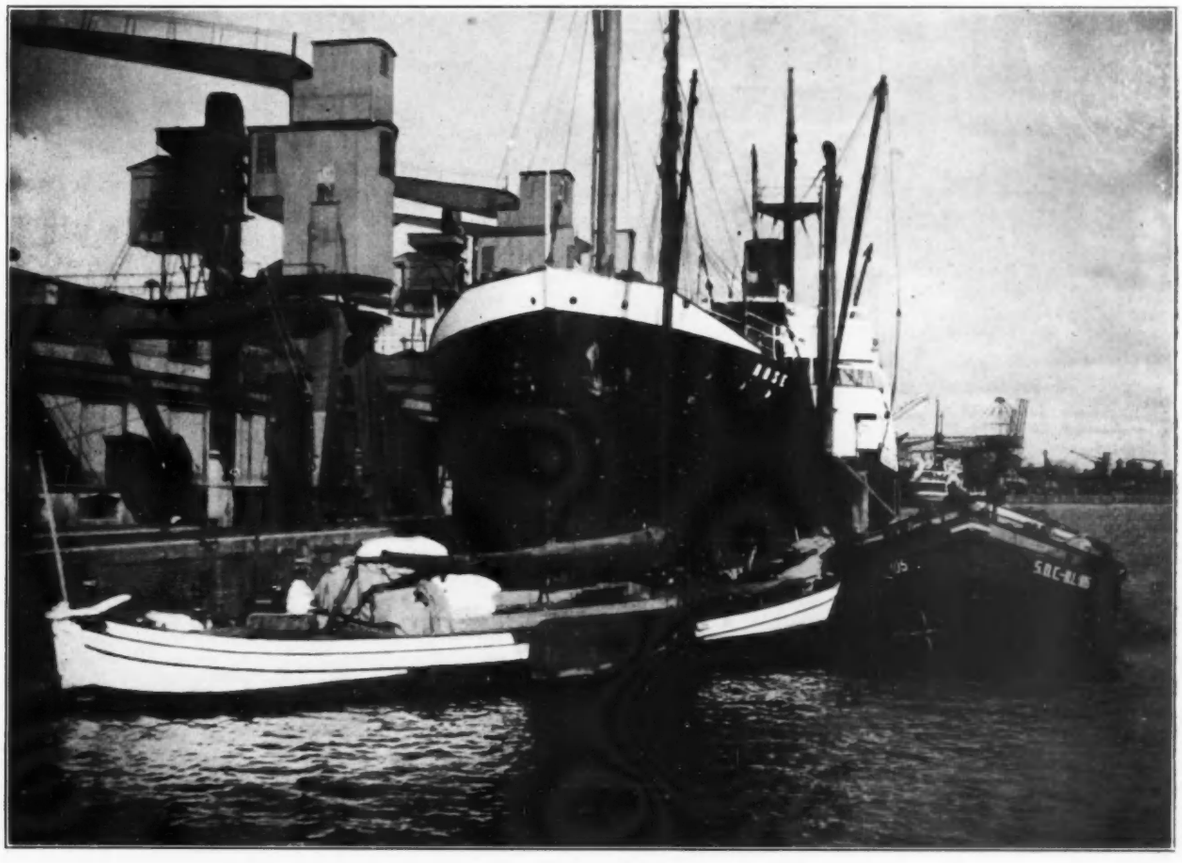

KEY MAP.
DENMARK
BALTIC SEA
SCHLESWIG
B. of Kiel
KIEL
HOLSTEIN
ELBE
Lubeck
Rostock
Pomeranian Bay
Stettiner Haff
HAMBURG
MECKLENBURG
STETTIN
BREMEN
R. ELBE
HANOVER
POMERANIA
R. ODER
Bredow
Züllchow
Grabow
R. ODER
HARBOUR LIMIT
DUNZIG CANAL
GRANARIES
SWINEMÜNDE
Bodenberg
MÖLLN PASSAGE
DAMMSCHER
LAKE



The Port of Stettin



Freeport of Stettin. In the West Basin.



In the Free Harbour of Stettin.

Concrete and its Many Uses in Docks and Harbours

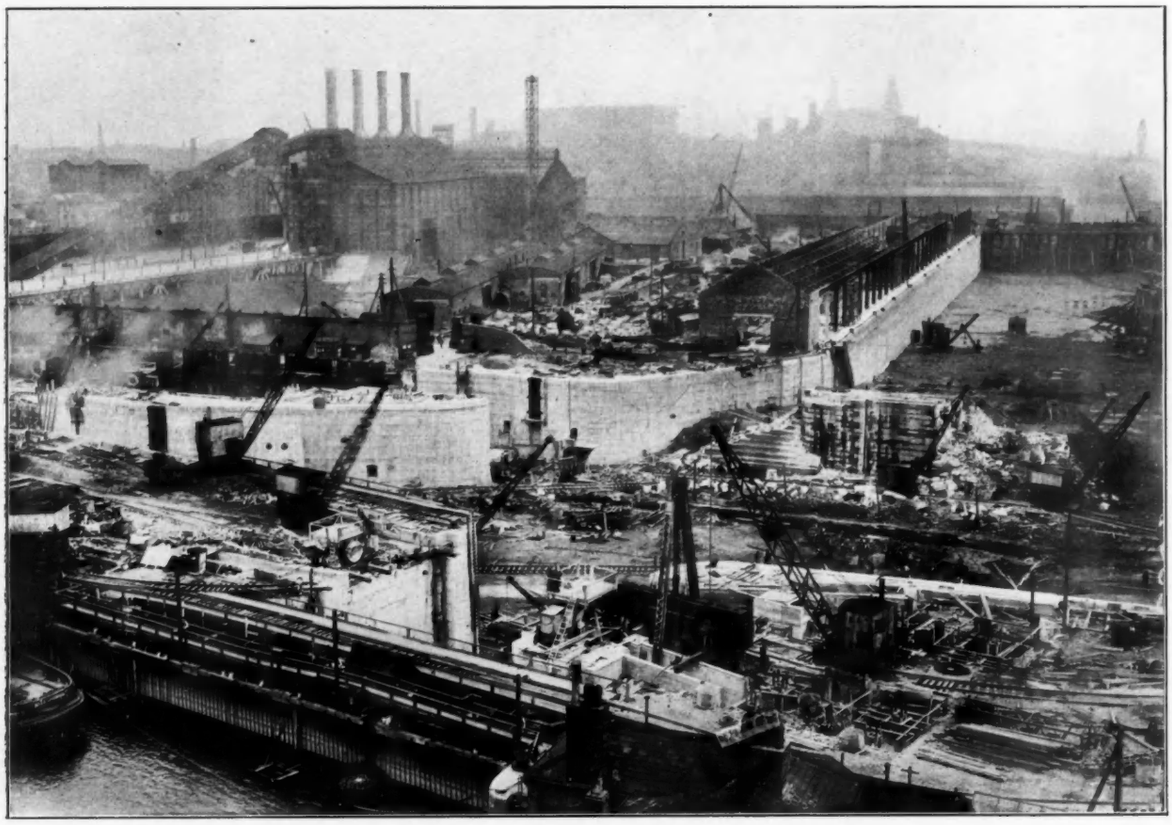


Fig. 1. New Trafalgar Dock and Passage at Liverpool.

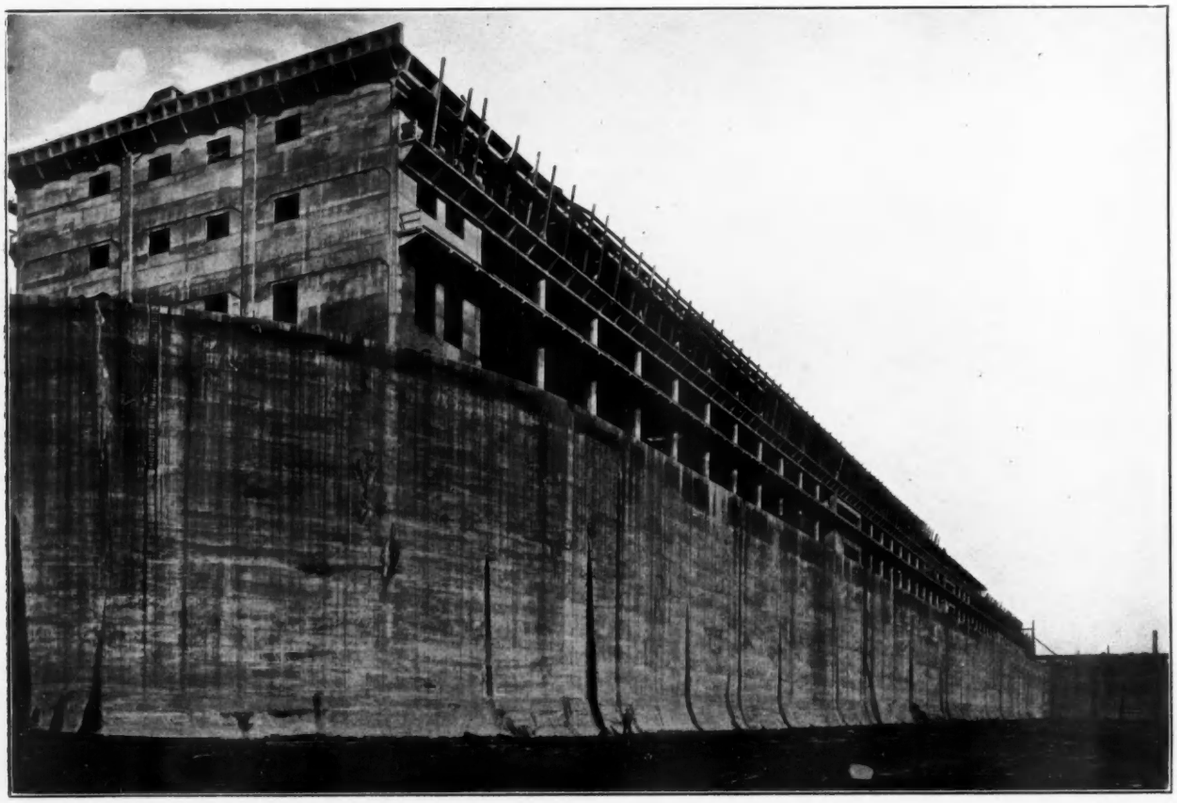


Fig. 3. Gladstone Branch Dock No. 1 at Liverpool.

Concrete and its Many Uses in Docks and Harbours—III

By W. A. LINSKILL, M.Sc., A.M.Inst.C.E.

Fig. 2. New Trafalgar Dock and Passage at Liverpool.

GRAVING DOCKS.
Concluded.

WET DOCKS.
Growth of dock systems.
Scarcity of early docks.
Progress during the 19th Century.
Modern docks.

CONSTRUCTION OF A TYPICAL DOCK IN LIVERPOOL.
General description.
Excavation.
Concreting.
Underpinning.
Shuttering.

LOCKS.
Examples.

Graving Docks

Concluded.

THE new graving dock at Southampton, which was opened by H.M. the King in July, is doubtless familiar to all readers of these articles, but they would be incomplete without this brief reference to such an outstanding achievement in the use of concrete in dockwork.

The fact that it represents part only of a dock system for every-day commercial use, serves to increase the fascination its mere size produces and incidentally to inspire even more respect for the material of which it is built.

It is the largest graving dock in the world at the present time, being 1,200 feet long and having an entrance width of 135 feet, and a depth of water 45 feet.

Wet Docks

Growth of Dock Systems.

It is beyond the scope of this article to detail the growth and expansion of our dock systems, but a brief reference to a few salient facts will assist towards an appreciation of the important part played by concrete in meeting the needs of the dock construction and the demands of shipping.

It would not be unreasonable to suppose that the size and number of ships are more largely influenced by the variety of cargoes and the volume of trade than by the resources and skill of the shipbuilder.

It has been stated, however, that although the volume of overseas trade increased very largely during the 17th and 18th centuries, the sailing vessels at the end of this period showed no corresponding advance upon that of the 16th century. It seems evident, therefore, that some other factor was operating to interfere with the expected development of shipping.

Scarcity of Docks in Early Days.

There is little doubt that the absence of docking facilities was responsible for this arrested progress.

An instructive light is thrown on the state of affairs at the beginning of the 19th century, when the ancient Port of Bristol held out as an inducement to shipping the advantage that vessels could lie there *on a soft bed of mud*. This, by the way, is still done at some foreign ports.

At that time, Liverpool had four docks totalling 15 acres of water area. The first was built in 1708.

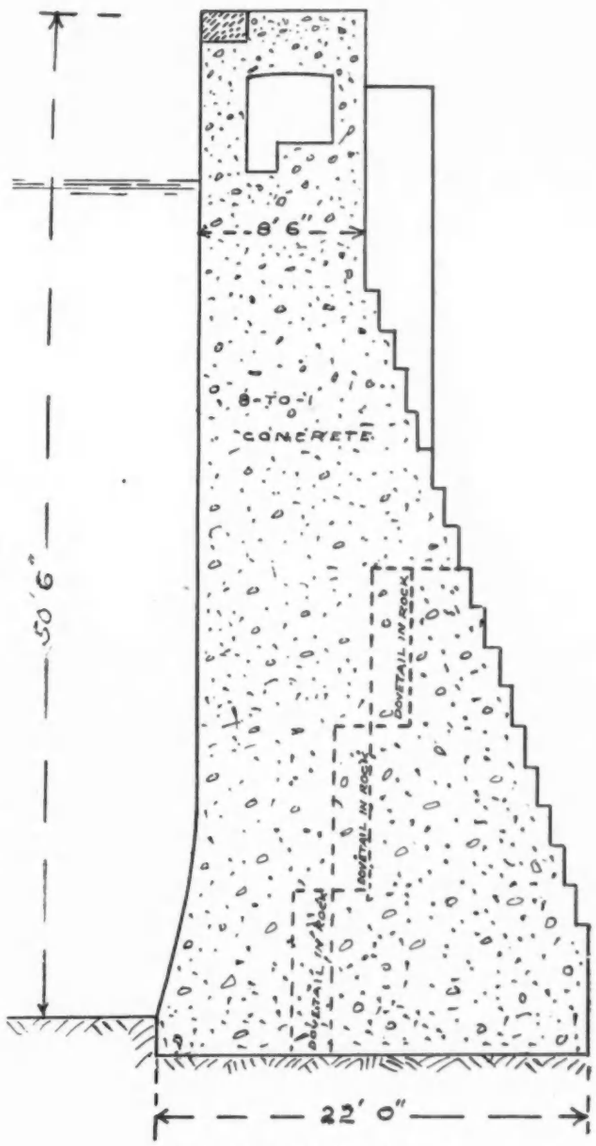


Fig. 4. Typical Wall Section.

Concrete and its Many Uses in Docks and Harbours—continued

Fig. 5. Canada Branch Dock No. 3. View along East Trench.

Up to 1790 there was only one small wet dock on the Thames, although another one was constructed shortly afterwards.

Hull also had only one dock of 10 acres area. The case of Bristol is doubtful, some reports crediting it with one dock, whilst on the other hand, it is stated that it did not possess even one.

Shipping had to make the best use it could of what harbours there were, and these were limited both in number and size.

Progress during the 19th Century.

The advent of the steamship must have forced the hands of the port authorities, because we find such a marked increase in the number of docks during the last hundred years. In the year 1900, there were 230 mercantile docks in Great Britain and Ireland having a total water area of 2,750 acres, besides about 600 acres of water surface in tidal and other basins. There was also an even greater number of graving docks.

Fig. 6. Canada Branch Dock No. 3. South Wall.

Fig. 7. Canada Branch Dock No. 3. View along North Trench.

By far the greater number of both classes of docks were constructed during the latter half of the century, this acceleration of the rate of progress being curiously enough coincident with the ever-increasing use of concrete.

It is a fair inference, that by substantially reducing the cost of construction, concrete has contributed very materially to this increased progress.

As in the case of graving docks, concrete gradually superseded masonry for quay walls. At first it was used as backing, with a masonry face, then the wall was built entirely of concrete, except for portions subjected to hard wear, such as rounded entrance heads, which either had large granite " rubbers " bedded in the concrete, or were protected by timber rubbing pieces. Ultimately the concrete wall earned the right to stand alone, a time-defying monument to the inventive genius of man.

To bear in mind some of the early docks, both at home and abroad, with their brick or masonry walls, limited length of quays and restricted depth of water, and then to contemplate the long stretches of concrete quay walls, fifty feet and more in height, which have been constructed in recent years, is to have an impressive object lesson on what our ports and shipping owe to the use of concrete.

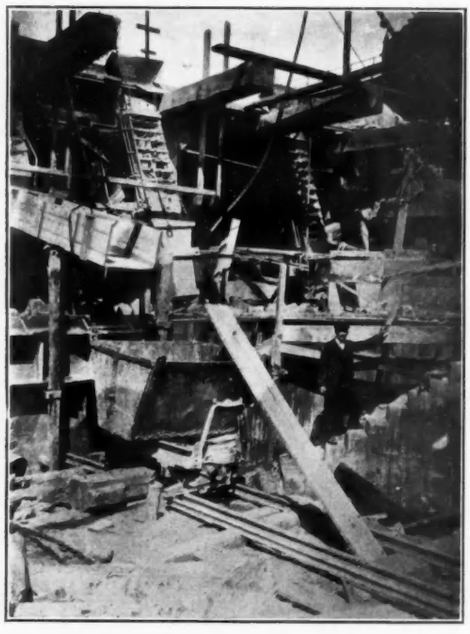


Fig. 8. Canada Branch Dock No. 3.

The views reproduced herewith, by kind permission of Mr. T. L. Norfolk, Engineer-in-Chief to the Mersey Docks and Harbour Board, of the New Trafalgar Dock and Passage, illustrations Nos. 1 and 2, and also of the mass concrete North wall of the Gladstone Branch Dock No. 1 with its reinforced concrete shed, illustration No. 3, are typical of what is being achieved by the use of concrete, not only in British ports but by

Concrete and its Many Uses in Docks and Harbours—continued

up-to-date Dock Authorities throughout the world. The detailed design may vary, but full use has been made of the advantage offered by the use of concrete.

Fig. 9. Canada Branch Dock No. 3.

Construction of Canada Branch Dock No. 3

General Description.

This dock, completed in 1906, is the third of a series of branches opening from the main basin of Canada Dock on its Eastward side, and it extends towards the Overhead Railway. Its length averages 1,050 feet and the width is 300 feet, thus giving a water area of just over 7 acres.

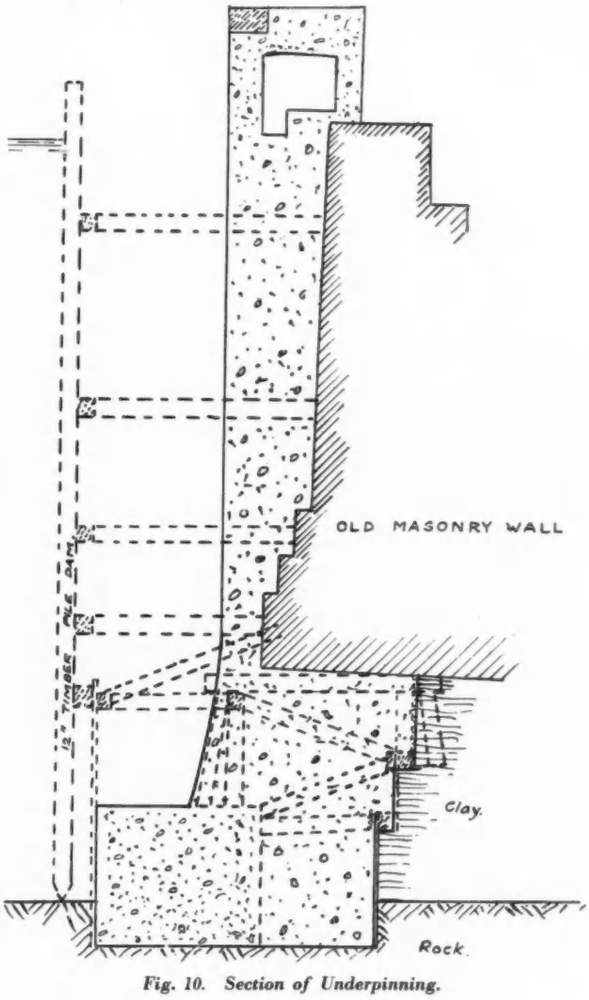


Fig. 10. Section of Underpinning.

The floor of the dock, mostly rock, is 50-ft. 6-in. below coping level, and the average depth of water is 42-ft.

There were about 670,000 cubic yards of excavation, of which 140,000 cubic yards were in rock, the remainder being in clay. At the East end of the dock, rock was found at a depth of about 28-ft. below coping level, but its surface dipped considerably towards the entrance, where the wall foundations had to be taken down to a depth of about 60-ft. to reach solid rock. Elsewhere the minimum depth of wall was 52-ft. 6-in.

The walls were of 8-to-1 mass concrete and had a thickness of 8-ft. 6-in. at coping level. The face of the wall was vertical with a slightly curved toe, the back was stepped out in a series of 8-inch offsets, which increased thickness to 22-ft. at foundation level, except where rock was encountered at a higher level. In this case the wall thickness was reduced, the back of the trench being trimmed down in one, two or three benchings as required, with dovetails in each benching. This is shown in fig. No. 4, which gives a cross section of the wall. The total amount of concrete in the walls was about 58,000 cubic yards.

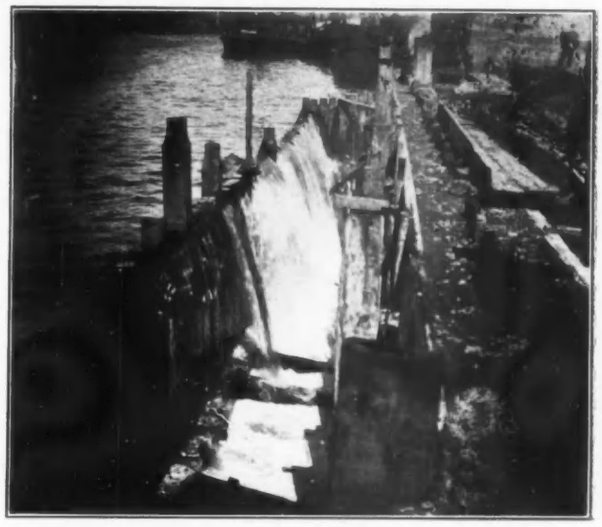


Fig. 11. Canada Branch Dock No. 3. Old wall re-faced and raised showing "plums" in concrete and exceptional high water overflowing dam.

Excavation.

To economise in trench-work for the walls, the clay was excavated first by steam navvy down to the level of the rock and to a line clear of the back of the wall where the ground was left at a stable slope, the amount of excavation behind the wall being afterwards refilled to the proper level.

Where space was restricted, as for example at the East end of the dock, this method could not be adopted and the trench had to be sunk from the surface. Illustration No. 5 is a view along the bottom of this trench, and shows the timbering across the upper portion where the sides were clay, whilst the rock in the lower portion stands unsupported. The curved shutters seen leaning against the back of the trench, have been stripped from the curved toe.

The next illustration, No. 6, shows the end of the slope and the beginning of the timbered trench at the East end of the South wall. In the foreground, the concrete is seen to be almost up to the top of the rock.

Illustration No. 7 is a view along the North trench and shows one of the rock benchings with rough dovetail at back. In the distance is the rough end of a length of wall already built.

Concreting.

Two Taylor rotary mixers were installed at the North-West corner of the site, where shingle brought by boat could be conveniently unloaded close beside them. In addition to these, several " gravity " mixers were also used. Three of these are seen in the illustration No. 8, serving the East wall.

An interesting feature of the distribution of concrete was in the use of a cableway which, erected over the whole length of the North Wall, conveyed skips of concrete direct from the mixer to any part of the wall, illustration No. 9. The skips had double doors at the bottom fastened with a catch and were lowered nearly to the concrete level before depositing their load.

Steam travelling cranes with specially long jibs were used to convey skips of concrete from the mixers to the South wall, and deposit the concrete there. There was practically no difference between the respective costs of distribution by the two methods just described.

Concrete and its Many Uses in Docks and Harbours—continued

Underpinning.

The new walls were splayed back at the entrance to meet the existing quay walls, and at the junction and for some distance along the existing quay, the old walls had to be underpinned, as their foundations were some 7-ft. or so above the level of the floor of the new dock. The whole of this underpinning and the new facing to old masonry walls was 8-to-1 concrete.

The total length of underpinning was 175-ft., and its depth below the old wall was about 16-ft.

The ground was excavated to this depth in front of the old wall and for the whole length which had to be underpinned. A concrete toe was then filled into this trench. This toe safeguarded the dam and supported the old wall which was propped off it as shown in fig No. 10.

The actual underpinning was carried out in alternate short lengths, the method of timbering being shown in the diagram.

The facing concrete was, of course, brough up for the full length at each lift.

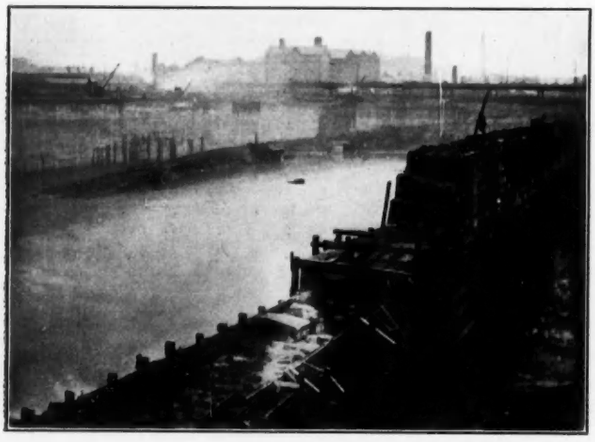


Fig. 12. Canada Branch Dock No. 3. South Wall.

Illustration No. 11 shows an unprecedented high tide overflowing the dam in front of this underpinning, which had fortunately been completed, and the facing concrete also brought up well above the old wall. The stone " displacers " or " plums " in the concrete will be noticed. The next illustration, No. 12, gives some idea of the amount of water that flooded the dock. The extensive use of "plums" in the concrete is also shown.

The counterforts at the back of the wall were for the purpose of supporting the future sheds. The extra excavation taken out behind the wall is also noticeable here.

Shuttering.

The face shuttering was of 3-inch deals formed into panels about 14-ft. long and 4-ft. 6-in. high. It was supported by " soldiers " bolted into the concrete below. These are shown in several of the illustrations, including No. 13.

Locks

Not the least important of the various items essential to an efficient dock system is the entrance lock, and this above all must of necessity keep pace with the increase in the size of vessels trading or calling at the port. Failure to do so would very seriously handicap any port, and so for some time past, dock engineers, in view of the rate of growth of ships, have aimed at building for the future, by providing entrance locks of such ample dimensions, that it will be some time before trade requirements overtake the dock accommodation now available in the larger ports.

The width of entrance locks attained 80-ft. in the last century, then increased to 90-ft., as at Cardiff and Swansea, still later reached 100-ft. at Avonmouth, Newport and King George V. Dock, London, 110-ft. at Tilbury; and 130-ft. at Liverpool.

Fig. 13. Canada Branch Dock No. 3. Shuttering on South Wall.

Although the increase in length has not been quite proportional to the increase in width, the dimensions reached are sufficiently remarkable, there being many locks with a length of 800 to 900 feet, and three having a length of 1000 feet and over.

A most useful depth of water over the sills has also been provided, enabling large ships to pass through the locks for some considerable time before and after high water.

The two illustrations, figs. Nos. 14 and 15, reproduced herewith by kind permission of Mr. A. Binns, Engineer to the Port of London Authority, are of the entrance lock to King George V. Dock, and give an impressive view of the massive concrete walls, now such a usual feature of dockwork.

The Gladstone entrance lock at Liverpool was illustrated in the previous article.

The Port of Halifax

Shipping.

During the month of June, 1933, a total of 496 vessels entered and cleared the Port of Halifax as compared to 528 for June, 1932, and 495 for June, 1931. The net registered tonnage is reported at 362,516 tons as compared to 465,325 for June, 1932, and 532,958 tons for June, 1931. The number of vessels engaged in the Trans-Oceanic service entering and clearing during the month of June, 1933, totalled 106, as compared to 120 for June, 1932, and 151 for June, 1931. The number of vessels engaged in the Coastwise trade entering inward and outward totalled 390, as compared to 408 for June, 1932, and 344 for June, 1931.

Since January 1st, 1933, the total number of vessels arriving and departing at the Port of Halifax is reported at 2,707, as compared to 2,755 for the same period of 1932 and 2,629 for the first six months of 1931.

Cargo Tonnage.

The total cargo tonnage handled inward and outward during June, 1933, is reported at 110,892 tons as compared to 124,316 tons for June, 1932, and 148,940 tons for June, 1931. The total cargo tonnage reported for the first six months of the year for the Port of Halifax totalled 752,403 tons as compared to 810,600 tons for 1932 and 861,862 tons for 1931.

Details of cargo tonnage are given in the monthly report and it is interesting to note that traffic over the Commissioners' Piers reports increases while privately owned properties have continued to show shrinkages from the first of the year.

Details of the movements of cargo tonnage by major trade routes for the month of May and the first five months of the year are reported, also by commodities. While decreases are reported in the South American, West Indies, Newfoundland and Coastwise trades, increases are reported in Trans-Atlantic, Asiatic and African. In connection with the trade routes, it is interesting to note that the Trans-Atlantic cargo tonnage for the first five months of the year is reported at 224,013 tons, as compared to 161,164 tons for the same period of 1932 and 124,113 tons for 1931.

Passengers and Mail.

The total number of passengers landed and embarked at the Port of Halifax during the month of June, 1933, is reported at 609, as compared to 1567 for June, 1932. Since January 1st, the passenger traffic is reported at 10,559 as compared to 12,667 for the first six months of 1932.

The quantity of mail handled during the month of June, 1933, is reported at 241 bags, as compared to 273 for June, 1932. For the first six months of 1933, 67,350 bags of mail were handled as compared to 71,417 for the same period of 1932.

Concrete and its Many Uses in Docks and Harbours

Fig. 14. Entrance Lock to King George V. Dock.

Fig. 15. Entrance Lock to King George V. Dock.

Notes from the North

Ferry Re-opened.

EGREMONT FERRY, in the River Mersey, which has been out of commission for several months, re-opened on August 1st. A few days before this crowds of people on the promenade saw the Mersey Dock Board crane, Mammoth, place the huge 60-ton girder bridge in position. The time chosen for the operation was nearing high water, when Egremont stage was raised, and therefore the "drop" of the bridge, while being fixed in position, was at its lowest.

Expert in Dock Gate Construction.

Mr. Thomas Lawson, who died recently at the age of 82, was in the employ of the Mersey Docks and Harbour Board for 39 years as superintendent shipwright. He was an expert in the construction of dock gates and carried out some very important and difficult work. He was lent to the Port of London Authority for the erection of the Tilbury dock gates, and was also lent for superintending the construction of the locks on the Manchester Ship Canal.

Mersey Tunnel Ventilation.

The Mersey Tunnel Joint Committee has accepted the tender of Messrs. John Mowlem and Co., Ltd., of London, amounting to £229,792, for the erection in nineteen months of the George's Dock (Liverpool) ventilating station. Contracts for five out of the six ventilation buildings have now been placed, the exception being those at Woodside.

There are 400 men now employed on four current contracts, and in addition about 100 on the foundations at Woodside. The value of the engineering works to date is as follows: Headings £643,582, river tunnel £1,478,368, Birkenhead tunnels £906,000, Liverpool tunnels £697,000, river tunnel roadway £381,000, ventilation works £241,000, Walker fans £24,000, Sturtevant fans £12,300, lighting fittings £5,100, driving gear and electrical equipment £78,000, retaining walls (George's Dock) £33,000, electric cables £15,000, making a total of £4,514,350.

New Ferry Boat?

The purchase of a new ferry boat is hinted at by the decision of the Wallasey Ferries Committee to instruct the general manager to obtain plans, drawings and specifications of a new vessel at an estimated building cost of £43,000. The Finance Committee have asked for detailed reports of the services of the boats now in commission with a view to deciding whether or not a new boat is necessary.

Deterioration of Foreshore.

Douglas Corporation has had under consideration the fact that the action of the sea recently caused serious deterioration to the foreshore of Douglas by the withdrawal of large quantities of sand therefrom. A committee, consisting of five members of the Council, has been appointed to investigate the causes of such deterioration and to report as to the steps which should be taken by the Council to maintain the foreshore as the principal attraction of visitors to the island.

New Works for Ship Canal.

Another new oil refinery is to be established on the banks of the Manchester Ship Canal—at Ellesmere Port—by Lobitos Oilfields, Ltd. A site has already been secured on the Ship Canal for the establishment, which will be a small one to begin with, but there will be room for extension if the results warrant it. No great amount of labour is required in the working of an oil refinery, the operations being largely mechanical, but the distribution of the products will provide further employment.

Taxation of Dock Vehicles.

Liverpool interests are frankly disturbed by the refusal of the Ministry of Transport to grant relief to motor vehicles employed in dock areas and are continuing to exert pressure on the authorities. Mr. R. V. Edwards, chairman of the Transport Committee of the Chamber of Commerce, has written to the Minister pointing out that the increased taxation of such vehicles will place the importers at Liverpool at a distinct disadvantage when compared with other ports, such as London and Hull.

Floating Bridge Weights.

Representations are being made by Liverpool transport associations to the Mersey Docks and Harbour Board with the object of securing amendment of the regulations restricting the weights of vehicles now using the floating bridge leading to the Liverpool landing stage. The permissible weight is less than the permitted weights on the public highways and on the Wallasey floating bridge. It is felt this is an anomaly that should be removed as soon as possible.

Mr. Thomas Rome.

Mr. Thomas Rome, who has completed 40 years as a member of the Mersey Docks and Harbour Board, received birthday felicitations at a meeting of the Board. He is 81 years of age. The Board was formed in 1858, and Mr. Rome's membership has extended over more than half the duration of this important authority.

Point Lynas Pilotage.

Mr. Charles S. Edgar, who presided at the annual meeting of the Liverpool District Chartered Shipbrokers' Association, said the heavy port charges in the Mersey were a great handicap to shipping and to Lancashire generally. The Association's committee were constant in their endeavours to bring about some reductions, but the results were not encouraging. It had been submitted to the Dock Board that the pilot station at Point Lynas could with safety be abolished, and it was hoped that that might be done, and some reduction in the heavy pilotage charges should follow.

Dock Warehouse Profits.

The Manchester Dock and Warehouse Extension Company and the Manchester Ship Canal Warehousing Company continue to return steady profits annually, the former's profits being £38 less and the latter's £63 more than last year. The reason is, of course, that their principal revenue is from properties let on lease to the Manchester Ship Canal Company. The companies are also closely associated, in that the chairman and vice-chairman of both are Mr. Alfred Watkin and Mr. Harold Bacon respectively, while Mr. H. C. Smith is also a member of both Boards. The Dock and Warehouse Extension Company returns a revenue, after charging expenses of management and debenture interest, of £34,212, against £34,250. Dividends are as last year.

Canal Traffic Returns.

Manchester Ship Canal Company reports that the traffic receipts for the month of June, 1933, amounted to £93,982, against £101,095 in June last year, a decrease of £7,113. The traffic receipts for the half-year ended June 30th, 1933, amounted to £574,959, as compared with £596,079 for the corresponding period of last year, a decrease of £21,120. The net revenue of the whole of the undertaking for the half-year (after providing for interest and fixed charges) was £9,467 less than the corresponding half-year in 1932.

Railway Wharves on Deeside.

Mr. Maxwell Fyfe, on behalf of the L.M.S., which has extensive wharfage space on Deeside, stated at the Government enquiry into the Dee Catchment scheme that the company had taken steps to provide sea defences, and added that in 1932, when there was a breach of the Mostyn embankment, they spent £12,000, and 200 men were employed for a week and 23,000 tons of material were utilised in dealing with it. In 1904, when it was necessary to repair the Holywell embankment, the cost was £100,000. The company asked to be excluded from the scheme.

Dock Board Objections not Pressed.

Wallasey Corporation proposes to borrow £44,000 for the carrying out of a sewerage scheme for Wallasey and the Bidston low-lying area. The application was originally made in 1930, but was adjourned on account of opposition from the Mersey Docks and Harbour Board. The Corporation has since been in negotiation with the Dock Board, and as the result the objections are not being pressed. Scientific investigation is proceeding regarding the disposal of crude sewerage from neighbouring authorities on Merseyside. Mr. L. St. G. Wilkinson, Borough Engineer and Surveyor, stated at the Ministry of Health inquiry at Wallasey that, broadly speaking, the drainage of the former Borough of Wallasey was by means of the marginal sewer belonging to the Mersey Docks and Harbour Board running along the Dock Road in the vicinity of the Great Float. The sewer was originally constructed for the purpose of receiving the drainage which would otherwise have flowed into the Wallasey Pool, and which had been converted by the Dock Board into a dock. About 1,680 acres were drained by the marginal sewer. The drainage of sundry small areas of 563 acres was arranged by various pipes discharging into the Mersey below low water level, and in no cases had any complaint been received by reason of this discharge. The natural drainage of the area was into the River Birket, and the Corporation had under consideration at the present time a scheme for the more rapid discharge of surface water from the Birket. The scheme would eliminate any likelihood of flooding from the greater impermeability of the area as development progresses. The sizes of the sewers had been calculated for an ultimate population of 40,000 in the whole of the area affected by the scheme.

The Port of New York

Latest Data issued by the Bureau of Commerce

Value of Foreign Trade at the Port of New York.

THE value of foreign trade at the Port of New York in May, 1933, was $87,668,000, which was higher than in any month this year. Imports, which were $52,015,000, marked the high point in 1933, but exports, which were valued at $35,653,000, were greater only than the previous month. While these figures are lower than those of May, 1932, the differences are comparatively slight, the total foreign trade value being only 4 per cent. under last year's figure. Exports were 7 per cent. lower than May of last year, while imports were only 0.9 per cent. less than that month.

	May		Net Change	
	1933	1932	Amount	Per Cent.
	$	$	$	
Exports	35,653,000	38,435,000	—2,782,000	—7·2
Imports	52,015,000	52,496,000	—481,000	—0·9
Exports and Imports	87,668,000	90,931,000	—3,263,000	—3·6

The foreign trade situation at the Port of New York appears all the more favourable in the light of a comparison of foreign trade values of the United States as a whole for May of 1933 and 1932, which shows a total decline of 10 per cent. Exports declined 14 per cent. and imports 5 per cent.

For the five months ending May, 1933, the value of foreign trade at the Port of New York was 22 per cent. less than the same period in 1932. Exports were 18 per cent. less, while imports were 26 per cent. under last year.

	January-May		Net Change	
	1933	1932	Amount	Per Cent.
	$	$	$	
Exports	181,581,000	220,174,000	—38,593,000	—17·5
Imports	233,712,000	314,851,000	—81,139,000	—25·7
Exports and Imports	415,293,000	535,025,000	—119,732,000	—22·4

Ten Ranking United States Ports in Foreign Trade.

A recent report of the United States Shipping Board ranks United States ports according to the volume of their exports and imports in the calendar years 1931 and 1932. In both years, New York is followed by Los Angeles in second place. Philadelphia, which was fourth in 1931, has advanced to third place in 1932, while Baltimore has dropped from third to fifth place. Boston retained its position as No. 9 in both years.

The following tabulation shows the volume of exports and imports for the ten ranking ports of the United States for the year 1932. Perhaps the most striking feature of the table is the wide lead of the Port of New York over its nearest competitor, Los Angeles, whose volume of foreign trade was 27 per cent. of that of the leading port:—

Volume of Exports and Imports of Ten Ranking United States Ports
Calendar Year 1932

Ports	Rank	Exports and Imports Tons	Rank	Exports Tons	Rank	Imports Tons
New York ...	1	14,804,620	1	4,125,472	1	10,670,148
Los Angeles ...	2	3,989,185	2	3,568,487	8	420,698
Philadelphia ...	3	3,988,605	8	1,071,144	2	2,917,461
New Orleans ...	4	3,338,611	5	1,543,798	4	1,794,813
Baltimore ...	5	3,180,385	15	540,509	3	2,639,876
Houston	6	2,876,149	3	2,730,917	26	145,232
Buffalo	7	2,468,882	11	824,525	6	1,644,357
San Francisco ...	8	2,461,563	4	1,780,512	7	681,021
Boston	9	1,973,537	34	194,108	5	1,779,429
Port Arthur ...	10	1,645,782	6	1,496,102	25	149,680
Total Ten Ports		40,727,319		17,875,604		22,851,715
ALL U.S. PORTS		60,554,846		31,844,566		28,710,280

The total volume of the foreign trade of the above ten ports constitute 67 per cent. of the whole of the United States. They account for 80 per cent. of the volume of imports and 56 per cent. of the exports. The percentages of the individual ports are as follows:—

Percentage of Volume of United States Foreign Trade Handled at Ten Ranking Ports, 1932

	Exports and Imports per cent.	Exports per cent.	Imports per cent.
New York	24·4	13·0	37·2
Los Angeles	6·6	11·2	1·5
Philadelphia	6·6	3·4	10·2
New Orleans	5.5	4·8	6·3
Baltimore	5·3	1·7	9.2
Houston	4·8	8·6	0·5
Buffalo	4·1	2·6	5·7
San Francisco	4·1	5·6	2·4
Boston	3·3	0·6	6·2
Port Arthur	2·7	4·7	0.5
Ten Ports	67·2	56·2	79·6
Total United States	100·0	100·0	100·0

Vessel Movement in Foreign Trade.

Vessels entered and cleared in foreign trade at the Port of New York during the month of June, 1933, numbered 398 and 446 respectively. The number of entrances were 10 per cent. less than in June, 1932, and the clearances were 3 per cent. less.

	June		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels ...	398	444	—46	—10·4
Clearances, No. of Vessels ...	446	458	—12	—2·6
Entrances, Net. Reg. Tonnage	2,120,492	2,401,754	—281,262	—11·7
Clearances, Net. Reg. Tonnage	2,327,861	2,435,910	—108,049	—4·4

Of the entrances, 19 vessels, or 5 per cent. were in ballast, as compared with 27 vessels, or 6 per cent. in June, 1932, and 71 clearances of vessels, or 16 per cent. as against 72 vessels, also 16 per cent. in the corresponding month last year.

An analysis of the figures for the first six months of the year shows that the decline in the number of entrances in foreign trade during the period was 13 per cent. and in the clearances 11 per cent. as shown in the following tabulation:—

	January-June		Net Change	
	1933	1932	Amount	Per Cent.
Entrances, No. of Vessels	2,354	2,718	—364	—13·4
Clearances, No. of Vessels ...	2,491	2,792	—301	—10·8
Entrances, Net Reg. Tonnage	12,593,733	14,057,554	—1,463,821	—10·4
Clearances, Net Reg. Tonnage	13,028,661	14,150,142	—1,121,481	—7·9

Steamship Sailings.

During the month of June a total of 1,224 vessels in foreign and domestic service sailed from the Port of New York. Approximately one-third of this number, or 415 to be exact, were engaged in foreign trade, of which 288 sailed direct to foreign ports. While the direct sailings in this latter service number less than June, 1932, they show a small increase over the total of 279, reported for May of this year.

The inter-coastal service is showing very definite signs of revival, and 30 vessels sailed direct to Pacific Coast ports in June, which compares with 21 in the same month last year.

On Saturday, June 3rd, the peak day of the month, 69 vessels in all services sailed from this port. Of this number, 33 cleared for foreign ports, including 3 to the United Kingdom, 2 each to the Baltic and Hamburg, 1 each to Holland, France, Italy and India, 8 to the Caribbean-Mexican ports, 4 to South America, and 2 each to the Far East and Canadian-Atlantic ports. The 36 sailings in domestic service included 1 to the Pacific Coast, 9 to South Atlantic and Gulf ports, 7 coastal tankers and 1 coal carrier.

Commerce at Port Newark.

The receipts of water-borne cargo at Port Newark in June, 1933, were 23 per cent. greater than in the previous month, and 67 per cent. greater than in June, 1932. Receipts of lumber by steamer and lighter declined 11 per cent. while cargo other than lumber increased 98 per cent., as compared with June last year. Lumber shipped inland out of Port Newark in June amounted to 17,118,000 board feet, of which 5,893,000-ft. moved by railroad and 11,225,000-ft. by truck. Thirty-three steamers arrived during the month as compared with 27 in June, 1932.

Water-borne Receipts at Port Newark.

	June		Net Change	
	1933	1932	Amount	Per Cent.
All Commodities (tons)...	25,966	15,576	+10,390	+66·7
Lumber (board feet) ...	7,927,828	8,889,849	—962,021	—10·8
Other than lumber (tons)	22,002	11,131	+10,870	+97·7

The statistics for the first half of 1933 show an increase of 21 per cent. in water-borne tonnage received at Port Newark, as compared with the same period last year. Lumber increased but 0.8 per cent., but cargo other than lumber was 32 per cent. greater than in 1932. The number of steamers arrived also show a substantial increase during the six months period being 219 as compared with 166 last year, a gain of 32 per cent.

Water-borne Receipts at Port Newark.

	January-June		Net Change	
	1933	1932	Amount	Per Cent.
All Commodities (tons)...	232,198	192,436	+39,762	+20·7
Lumber (board feet) ...	62,269,454	61,792,187	+477,267	+0·8
Other than lumber (tons)	156,092	117,775	+38,317	+32·5

Aden Port Trust

The returns of shipping using the port for the month of June, 1933, are as follows:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	118	487,841
,, ,, under 200 tons ...	3	486
Government Vessels	3	7,990
Dhows	87	2,616
PERIM.		
Merchant Vessels over 200 tons ...	14	28,095

Rs.39,37,000/-, as compared with Rs.44,86,000/- for June, 1932, and of Exports Rs.27,54,000/- as compared with Rs.28,80,000/-.

The total value of both Imports and Exports together was Rs.66,91,000/-, as compared with Rs.73,66,000/- for the corresponding month last year.

Imports during the month were above those for June, 1932, in the case of grain, pulse and flour, gums and resins, hardware, raw hides, raw skins, sugar, printed or dyed piece goods, twist and yarn, unmanufactured tobacco, and private treasure; and below in the case of coffee, seeds, grey and white piece goods and manufactured tobacco.

Exports were above those for June, 1932, in the case of grain, pulse and flour, raw hides, raw skins, sugar, white and printed or dyed piece goods, twist and yarn, and private treasure; and below in the case of coffee, gums and resins, hardware, seeds, grey piece goods, and unmanufactured and manufactured tobacco.

TRADE OF THE PORT.

Article.	Unit	Imports.		Exports.	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal	Tons	0	0	0	0
Coffee	Cwts.	6,198	1,88,432	4,642	1,99,646
Grain, Pulse and Flour	,,	47,240	2,12,422	31,432	1,34,065
Gums and Resins	,,	1,916	33,362	2,073	37,635
Hardware	—	0	20,324	0	16,345
Hides, raw	No.	3,405	1,356	6,320	5,654
Oil, Fuel	Tons	41,406	10,35,150	0	0
,, Kerosene	Gls.	28,800	19,363	3,616	2,619
,, Petrol	,,	14,600	18,300	640	840
Salt	Tons	0	0	18,850	1,74,200
Seeds	Cwts.	2,349	13,573	986	7,624
Skins, raw	No.	497,170	2,15,268	845,494	5,85,038
Sugar	Cwts.	13,674	84,018	13,056	76,958
Textiles—					
Piece Goods, Grey	Yds.	3,415,800	4,37,908	2,532,975	3,02,124
,, ,, White	,,	645,154	99,526	238,625	44,516
,, ,, Printed or Dyed ...	,,	1,274,159	2,25,857	954,850	2,12,639
Twist and Yarn	Lbs.	244,901	1,16,118	232,714	1,14,306
Tobacco, Unmanufactured	,,	1,166,004	2,23,300	690,284	1,07,743
,, Manufactured	,,	47,936	41,722	25,499	20,966
Other Articles	No. of Pkges.	49,231	6,92,434	16,187	3,10,569
Treasure, Private	—	0	2,58,798	0	4,00,767
Total ...	—	—	39,37,231	—	27,54,254

The number of merchant vessels over 200 tons that used the port in June, 1933, was 118, as compared with 122 in the corresponding month last year, and the total tonnage was 488,000 as compared with 506,000.

Excluding coal, salt, fuel oil and military and naval stores and transhipment cargo, the total tonnage of Imports in the month was 7,800 and of Exports 5,000, as compared with 6,900 and 5,100 respectively for the corresponding month last year.

The total value of Imports excluding Government Stores was

Irish Harbour Matters

Dublin Port and Docks Board Audit.

The auditor's report on the accounts of the Dublin Port and Docks Board for the three years 1930-32 shows that expenditure of a capital nature was incurred during that period of £206,366.

The funds required were provided from:—Unappropriated Receipts Account, £27,037; Capital Account (Proceeds of Issue of 5 p.c. Redeemable Stock), £104,657; Bridge Rate Loan Account (Dublin Bridge Stock), £74,672.

The total Capital indebtedness of the Board had increased from £1,139,368 as at January 1st, 1930, to £1,291,473 as at December 31st, 1932.

The value of investments held for the various sinking funds, reserves, etc., aggregated £453,723 3s. 7d.

The financial transactions on the principal revenue accounts were:—

General Account—1930—Receipts £206,335, payments £186,889; 1931—£200,534 and £184,041; 1932—£187,622 and £191,737.

Custom House Docks and Warehouse Account—1930—Receipts £36,132, payments £26,043; 1931—£37,822 and £28,946; 1932—£38,860 and £29,790.

Pilot Fund—1930—Receipts £9,950, payments £10,335; 1931—£11,250 and £11,105; 1932—£11,457 and £11,476.

Break-up Sale at Rushbrooke Docks.

The disposal and sale of plant, machinery, stores and equipment of the Rushbrooke Docks, Co. Cork, took place last month and occupied four days. It was largely attended, a number of buyers being present from Great Britain. The sale marks the break-up of an industry established fourteen years ago in Cork Harbour at a cost of £400,000.

Some time prior to the sale, the Cork Harbour Board, at a meeting, rejected a motion by Mr. M. J. Corry, T.D., that the Board ascertain the amount that could be obtained for their yard, with a view to acquiring Rushbrooke Dry Dock in substitution.

Mr. Corry urged the need for maintaining the status of Cork as a first-class port and said they should possess a first-class dockyard where repairs to ships coming disabled into port could be effected.

Mr. M. O'Connor seconded the proposal.

Mr. R. S. Anthony, T.D., moved a direct negative. He said that Rushbrooke Docks had been closed in 1920 by Messrs. Beardmore, Ltd., because of the impossibility of continuing them, except at a huge loss, the loss at that time being from £11,000 to £12,000. It was stated that a turnover of £36,000 would be necessary to run it at a profit.

Waterford Harbour Board.

Waterford Harbour Commissioners, at a meeting on 18th July, after a long discussion, adopted the recommendations of its Economic Sub-Committee to reduce the outdoor staff to three-quarter time, and to cut the salaries of staff on a basis of 3½ per cent. Staff hours will not be changed.

The Port of Calcutta

(continued from page 297)

Panorama of the Area being Reclaimed.

The whole of the entrances and the quay walls have been constructed on the monolith or well type of foundation, the average size of each monolith being 40-ft. by 40-ft. with four shafts 11-ft. square in each. The monoliths were constructed on steel curbs or shoes with steining built from locally manufactured bricks, and at the entrances, where the deepest foundations were sunk, some of the monoliths weighed on completion over 4,000 tons.

The quay walls were built on the gravity section principle, the cutting edge of the well curbs in most cases being sunk to about —40 or about 20-ft. below final dredged level. The width of the walls between datum level and—40 varies between 36 and 44-ft., while from datum level to +24, which is the top level of the quay, the width decreases from 24-ft. at datum to 20-ft. at the top.

The three front columns of the transit sheds adjacent to the quay walls have been carried on special monoliths on account of the disturbance caused by sinking the quay wall wells, but the remainder of the shed columns are carried on slab and pyramid foundations.

The major portion of the excavation inside the wet dock was done by dragline excavators, and by flooding the area thus excavated in advance of the completion of the quay wall, conditions were set up which provided an additional factor of safety in the quay wall design, because the maximum conditions of loading were never brought about.

The curious bull-nose projection in the turning basin, which will at once be noticed by anyone studying a plan of the docks, is due to the presence there of a mosque. According to Mohammedan law all mosques occupy sacred ground and may not, in any circumstances whatever, be demolished to permit of the site being used for profane purposes. Most engineers who have worked in India will doubtless be able to recall similar instances where an awkwardly situated mosque or temple has necessitated the modification of some cherished scheme.

For some time after the docks were opened to traffic, difficulties were experienced due to accumulations of silt at the river entrances and in the vicinity of the caisson grooves. These difficulties have been largely overcome by systematic flushing and dredging, and apart from this the general design and construction of the first stage of King George's Dock has proved satisfactory. The general lay-out, however, has been modified more than once since the original plans were prepared, and it seems possible that further improvements may yet be made before the time comes (if ever it does) to begin work on further extensions. The whole of the project was carried through practically without a hitch, and certainly without a serious accident of any kind arising out of engineering design or construction.

The entrance lock, the two graving docks and the five berths were completed late in 1928, and King George's Dock was formally opened by Lord Irwin, who was then Viceroy, in December of that year, though actually it was not opened to traffic until some months later. This portion of the scheme cost approximately Rs.9 crores (£6,750,000), of which Rs. 1½ crores (£1,125,000) represented the interest which accrued during the period of construction and which was charged to the capital cost of the work.

A considerable portion of the money spent is, of course, unremunerative, as it was expended on the lock entrances, which, however necessary, earn no revenue, and the system as it stands is definitely not economical. Further extensions, however, can be made at much less than a proportionate cost, quite apart from the fall in prices that has occurred since 1928 and the changed conditions of the money market.

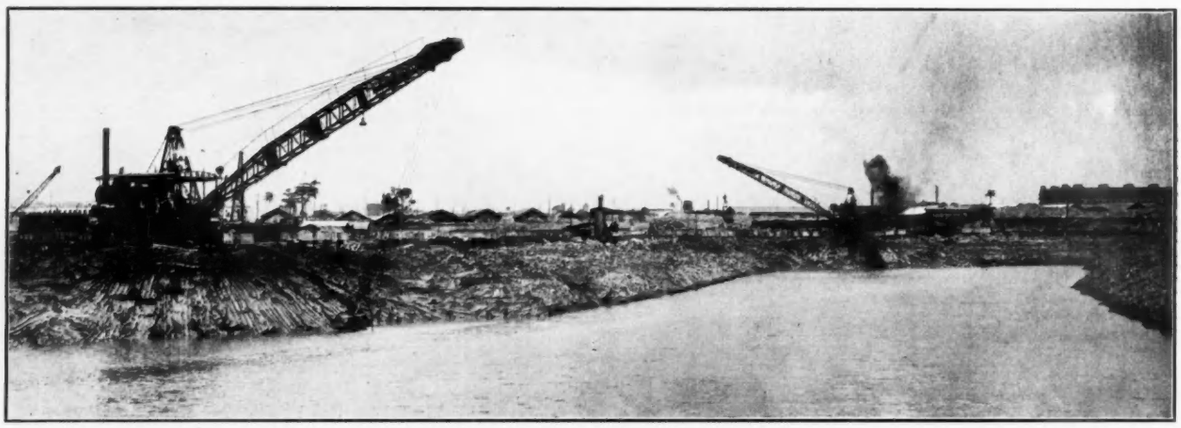
The entrances to the Kidderpore Docks are situated rather more than a mile above King George's Dock and on the same side of the river. The intervening river frontage is fully occupied by the five Riverside Berths, the Bengal Nagpur Railway's goods yard, the Hooghly Jute Mill and one of the Commissioners' tea warehouses.

Work on the Kidderpore Docks was begun in 1884, and the first portion was brought into use five years later. A number of additions were made from time to time, and the docks assumed their present form shortly before the outbreak of the Great War. The Kidderpore Docks now consists of two wet docks in tandem with a total of 28 berths and separated from each other by a swing bridge, a tidal basin, in which there is one general export

King George's Dock Construction: View of No. 2 Sliding Caisson in its camber, showing in the foreground the granite sill stones across the Lock Entrance.

View from the air of Garden Reach, with King George's Docks and the riverside berths in the background.

The Port of Calcutta—continued



King George's Dock Construction: Drag-line Excavators at Work.

berth, and three dry docks. The docks are connected with the river by two lock entrances with a width of 80 and 60-ft. respectively.

Dock No. 2, which is furthest from the river, is 4,500-ft. long by 400-ft. broad, and the available depth of water alongside the quay wall is 30-ft. In it there are five general produce berths, which serve double-storeyed sheds each with a total floor space of approximately 100,000 sq. ft., and eleven coal berths.

Coal forms one of Calcutta's most important exports, and, including bunker coal, in some years more than 4,000,000 tons have been sent away from Calcutta by sea. Some falling off has been observed recently, but the latest figures available show that a total of 3,431,837 tons of export and bunker coal were shipped during 1931-32. Two of the eleven coal berths in No. 2 Kidderpore Docks are fitted with a crane and skip system of mechanical loading. This is a variant of the Lewis-Hunter system, but, while the latter tips a whole wagon load of coal direct into a skip, which is then swung direct on board the steamer, the plant employed in Kidderpore Docks, known as the " Beckett " system, after its inventor, provides for the unloading of coal from wagons by hand into an intermediate hopper, from which the skip is filled. This variation is necessary because of the extensive use of covered wagons for the carriage of coal on the Indian Railways. The " Beckett " plant requires a large head of labour and is therefore only a partially mechanical system.

The more extended use of mechanical loading devices in the port of Calcutta for various reasons is not at present considered to be economically practicable. Many of the ships which load coal are not specially built for the work, and covered wagons, of which a fair percentage are received at the coaling berths, are of course unsuitable. Labour is cheap—a coolie earns rather less than 10d. per day—and in spite of the somewhat ridiculous looking little baskets of coal which they carry on their heads, a good gang of coolies, well organised, can load over 5,000 tons of coal from wagons into a ship in one day, at a cost to the shipper of about 9d. per ton. It is possible, however, that in the comparatively near future the question of providing mechanical loading berths will require further consideration and the better standards now demanded for housing coolies, together with proposed legislation regarding conditions, hours of work, etc., may make coolie labour in India a good deal more expensive than it now is.

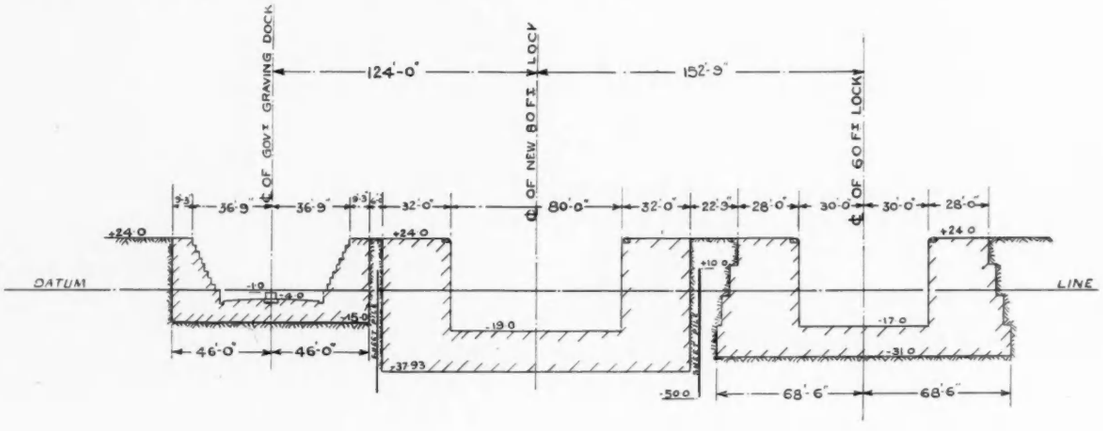
No. 1 Kidderpore Dock is 2,700-ft. long by 600-ft. in breadth, and has a depth alongside the quay wall of 30-ft. There are 12 general export berths serving single-storeyed sheds and provided with hydraulic cranes to lift 35 cwt. and 5 tons. Heavy lifts are dealt with at the 100-ton sheer legs situated between berths Nos. 5 and 7. In addition, the Commissioners provide three floating cranes to lift up to 20, 30 and 60 tons respectively, which are available for use throughout the port. There is also a heavy lift yard at the upstream end of the Calcutta jetties, where weights up to 30 tons can be handled.

The Tidal Basin, with an area of 9½ acres, is situated between Dock No. 1 and the lock entrances. In it there is one general produce berth serving a large double-storeyed shed and opening off it are three graving docks. No. 1 graving dock measures 538-ft. 9-in. by 69-ft. 6-in., with 25-ft. of water over the sill; No. 2 is 488-ft. 6-in. long by 69-ft. 6-in. in breadth and having 27-ft. of water on the sill. The third dry dock is small and is reserved almost entirely for the Commissioners' own vessels.

Until recently there was only one lock entrance to the Kidderpore Docks, measuring 60-ft. by 400-ft., though the length could be increased to 541-ft. by using the caisson stops at either end. There was in addition an 80-ft. entrance to the Tidal Basin, controlled by a single pair of gates, but this was only of very limited use, as it was necessary to lower the water level of the Tidal Basin to that of the river before a ship could be passed in or out. Further, owing to some doubt regarding the stability of the quay walls in the tidal basin, which had been giving considerable trouble during construction, it was not considered safe to lower the water to more than 14-ft. below the coping level. During neap tides the river never rises to this height, and in consequence the 80-ft. entrance could not be used sometimes for days on end. The arrangement, therefore, apart from being expensive, was most unsatisfactory.

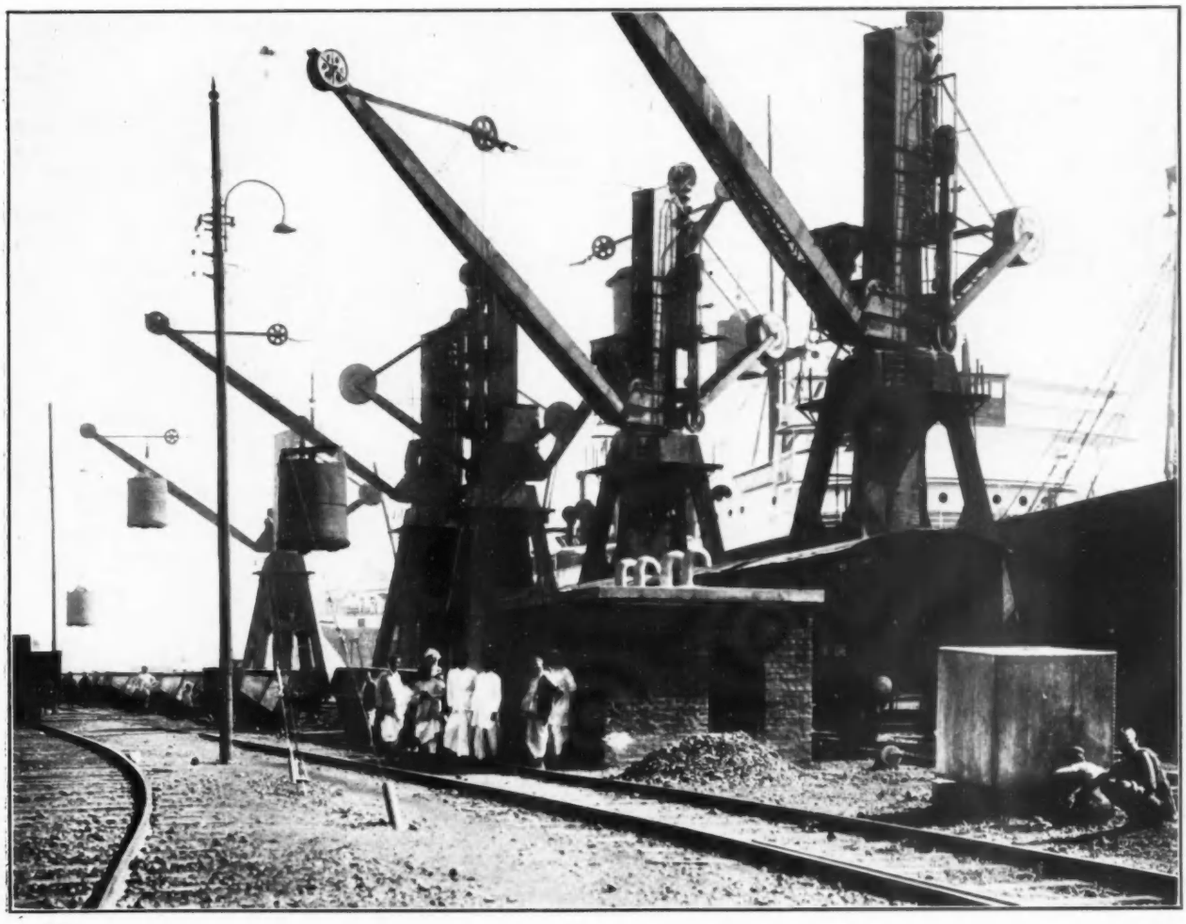
For these reasons, and also owing to the general increase in the size of ships entering the Hooghly, the need for a larger and deeper lock entrance had been apparent for a number of years, and when, after the war, the condition of the old lock became so bad that it was obvious that before many years it would be necessary to close it for a considerable time in order to affect repairs, the necessity for constructing a new lock entrance became pressing. Work could not be started for some time, however, as part of the site required for the new lock was the property of the Royal Indian Marine, but by the end of 1922 all the preliminaries had been successfully concluded and the work was in full swing.

The constricted space within which the lock had to be built (which is clearly shown in the accompanying diagram) necessitated elaborate precautions being taken at each step so that it was not possible to make fast progress. The lock was finally completed and opened to traffic early in 1932, and the old 80-ft. entrance to the tidal basin has now been permanently closed by a monolith dam.



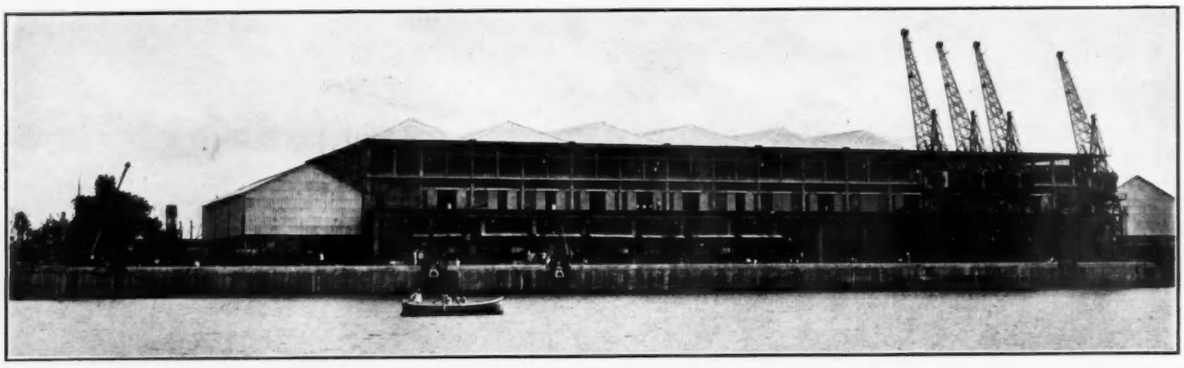
The Port of Calcutta

Entrance to the New 80-ft. Lock, from the River end.



"Beckett" Coal-loading Plant at No. 2 Kidderpore Dock.

The Port of Calcutta—continued



Import Shed No. 3, King George's Dock. Only Four Cranes had been erected when this photograph was taken.

The new lock has a width of 80-ft. with a length of 580-ft. between gates. Provision for the increased draught of ships entering the port has been made by positioning the sill at the river end 2-ft. lower than the corresponding sill in the old entrance, thus providing an available depth of water over the sill of 20.67-ft. at low water of spring tides, and it is anticipated that the new lock will accommodate the largest ships ever likely to use the port.

The new entrance is parallel to the old 60-ft. lock and situated between it and No. 3 dry dock. There is only 6-ft. on one side and 12-ft. 3-in. on the other between the walls of the new lock and the walls of the existing structures. The work was thus extremely hazardous and there was a grave danger that in the course of construction either the old lock or the dry dock might be undermined, but, as this was the only site available, there was no option but to proceed with the work. The necessity for extreme care, especially in the early stages, rendered the undertaking lengthy, as more expeditious methods of carrying out the work, which would have been adopted if the margin of safety had been greater, had to give place to slower and more expensive methods.

In building the new lock the monolith form of construction was adopted both for the walls and the floor. The wall monoliths were constructed of brick and for the most part measured 30-ft. square. Each monolith contained four square shafts measuring 7-ft. 6-in. by 7-ft. 6-in. The minimum depth to which these were sunk was 61-ft. below the level of the dock quay. The floor monoliths, 15 in number, were very much bigger, 10 of them measuring 74-ft. by 42-ft. and the remaining five being of even larger dimensions. Each of the floor monoliths contained eight shafts approximately 9-ft. square.

It was originally intended to build the floor of the lock in the dry, but this idea had to be abandoned when, in the course of sinking the side wall monoliths, sub-soil water was encountered at a much higher level than was expected. It was possible to excavate through the side wall monoliths in the dry down to a level of 45-ft. below quay level, but the sub-soil water encountered here gradually rose to as high as 16-ft. below quay level. Owing to the presence of this sub-soil water the floor monoliths had to be sunk in the same way as the side wall monoliths, though the floor monoliths in the permanent structure were only required to be 18-ft. deep.

In order to prevent the site being flooded while these floor monoliths were being sunk to the required depth their top level could not be permitted to sink below normal water level, and it was necessary, therefore, to build them up temporarily as much as 32-ft. above the permanent level required.

The permanent portion of the monoliths was built of cement concrete and the top 32-ft. of brickwork with a weak lime mortar, to facilitate subsequent demolition after the lower part of the shafts and the spaces between the monoliths had been plugged with concrete to the required level. The monoliths were finished off 2-ft. below the floor level and a final 2-ft. of mass concrete was super-imposed and levelled off to an even surface.

Towards the river end of the lock, owing to the unstable nature of the soil encountered, both the wall and floor monoliths had to be sunk to a greater depth, the deepest one being about 10-ft. lower than those at the other end of the lock. The final thickness of the floor varied from 20-ft. at the dock end to 30-ft. at the other.

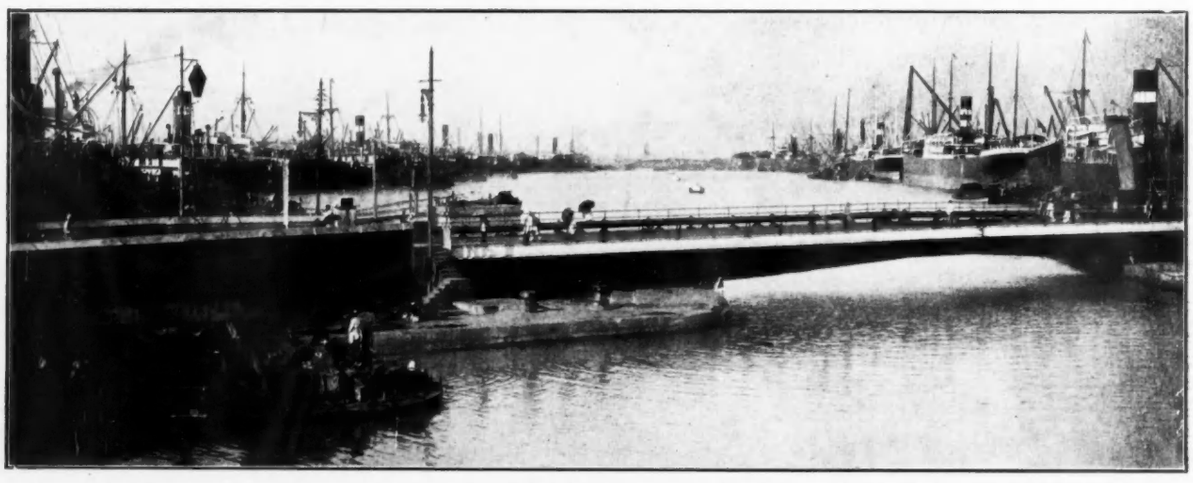
The facing of the lock walls up to a height of 24-ft. below quay level is of concrete. Above this level blue brick facing is provided with a backing of concrete.

Norwegian granite has been used throughout for the copings and for the gate sills and stops. The stones were imported dressed ready for setting and the final face dressing was subsequently done by Chinese labour after the stones had been placed in position.

The entrances to the lock are controlled by gates, which are operated hydraulically, the power being supplied by an electrically driven pumping installation which is also used as an auxiliary to the general hydraulic system of the docks.

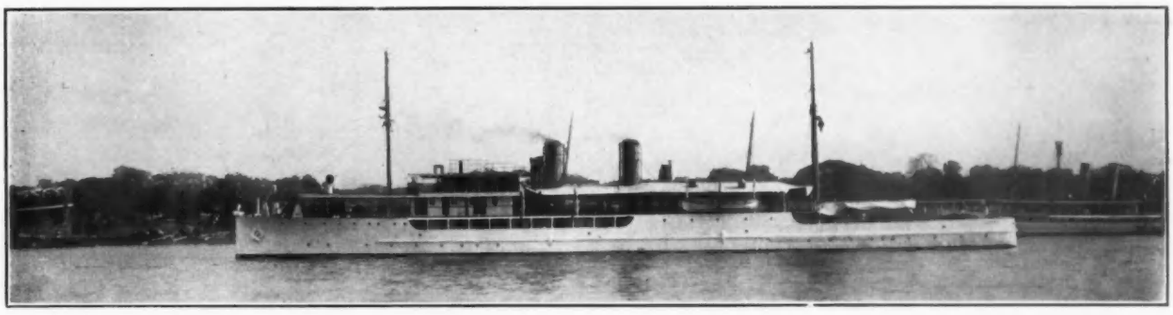
Levelling culverts have been provided of ample size, and it is possible to adjust the level of the water in the lock to that of the dock or the river in less than ten minutes. The whole operation of passing a vessel through the lock takes about 40 minutes, which compares favourably with the 55 minutes which was required for the same operation when the old lock was in commission.

The approach jetty, which is 492-ft. in length, is worthy of remark. A structure more substantial than the type of steel screw pile jetty hitherto largely used through the port was called for, and the one constructed consists of a series of monoliths 27-ft. square sunk at intervals, leaving a clear space of 33-ft. between each. These intervening spaces are bridged by a series of horizontal braced reinforced concrete beams in line with the front of the monoliths, forming a continuous face which is protected by heavy vertical and horizontal timber fenders. The decking throughout is of reinforced concrete, which is carried over the spaces between the monoliths on steel beams.



General View of No. 2 Kidderpore Dock. A Swing Bridge, over which passes Circular Garden Reach Road, and which separates Nos. 1 and 2 Kidderpore Docks is in the foreground.

The Port of Calcutta—continued



Despatch Vessel "Pansy." Single-screw ex-R.N. Sloop, used as a Tender for Lightships, etc., in the Port Approaches.

The cost of the whole project was approximately £1,222,000, of which about £266,000 represents the interest charges during the course of construction.

Shortly before the outbreak of the war the Commissioners acquired an area of approximately 1,500 acres of land to the south of the Kidderpore Docks in connection with the King George's Dock scheme. Much of this land is at present unoccupied, but it will eventually be used for future extensions of King George's Dock, and for the new railway marshalling yards which will be necessary in connection with those extensions. Any surplus, it is hoped, will ultimately be occupied for industrial purposes.

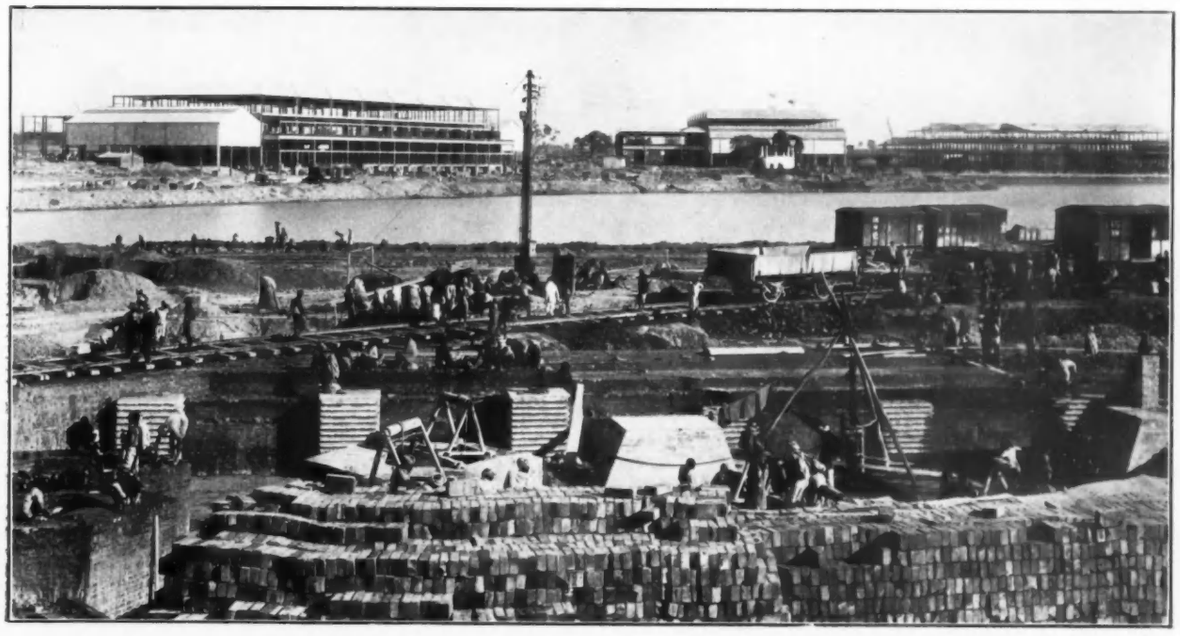
This land also serves a very useful subsidiary purpose, namely, as a dumping ground for the spoil that has been excavated—and may be excavated in the future—in the course of constructing King George's Dock. It may not generally be known to those who have never visited Bengal that practically the whole of the country for miles around Calcutta lies from 1 to 2-ft. deep in water for about 4 months of the year, while the rainy season is at its height, and that, although the site on which Calcutta itself stands has been raised, much of it even now is no more than 2 to 3-ft. above the level of the highest spring tides. This land belonging to the Commissioners which is at present surplus to requirements, is no exception to the rule, and most of it, when it was acquired, consisted of marshes, tanks and low-lying land.

A considerable area has been raised during the past ten years with the spoil excavated in the course of constructing the first portion of King George's docks, and a further 35 acres is now being reclaimed by means of pumping silt from the canal which connects the head of No. 2 Kidderpore Docks with Tolley's Nullah (see Supplement, August, 1933).

When the Kidderpore Docks were designed it was considered essential to obtain a supply of comparatively clear water for them. It was thought that if the silt-laden Hooghly water was admitted to the dock system very rapid siltation would result and that it would prove extremely expensive, even if it were possible to keep the docks dredged to a sufficient depth. The canal was therefore constructed with the idea that, if the necessary amount of water were drawn off from Tolley's Nullah at or about high tide, and were allowed to stand in the canal, most of the silt would be deposited and the water, which would then be comparatively silt-free, could later be drawn off for use in the docks.

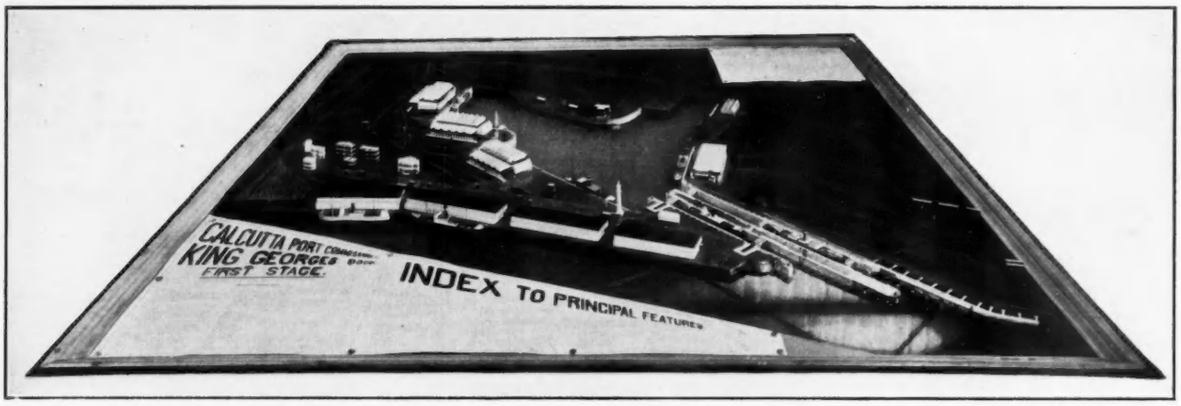
The system has worked well, and until recently the silt deposited in the canal was removed by grab dredgers and dumped into lighters, whence it was unloaded by hand on to the banks of the canal. This was an expensive business even after a credit had been allowed for the excellent bricks which were manufactured from the silt. For the last year or two, however, lighters which have been loaded with silt by the grab dredgers are towed or poled to a pumping station on the banks of the canal, whence the silt in a very diluted state is pumped to the site to be reclaimed. This water, heavily charged with silt, is allowed to circulate slowly while the silt is deposited, and is then directed back into the canal. The experiment has proved highly successful and has resulted, not only in a large area of potentially valuable land being reclaimed quickly and easily, but also in the cost of providing silt-free water for the Kidderpore docks being very greatly reduced.

The water for King George's Dock is provided by pumping direct from the river. When these docks were first designed a canal or aqueduct somewhat similar to that described above was considered to be essential. Such a system would have been expensive to provide and would have offered a serious obstacle to any future extension of the port, and extensive experiments were therefore carried out soon after the work on the docks was started with a view to discovering whether some other means of providing water could not be devised. It was then discovered that, contrary to all previous ideas on the subject, water that was comparatively lightly charged with silt could be obtained direct from the river by pumping only from near the surface and only at those states of the tide when the silt content near the surface was least. The necessary pumps were therefore installed, and as the system has proved to be successful it is intended eventually to close the Kidderpore Docks canal and to impound water both for Kidderpore and King George's Docks by pumping from near the entrances of Kidderpore Docks. The water level of King George's Docks is 6-ft. below that of Kidderpore Docks and the water will therefore flow



A View from the West Side of King George's Dock when it was nearing completion. The Sheds for Import Berths Nos. 2, 3 and 4 are practically completed, but the Basin has not yet been fully excavated.

The Port of Calcutta—continued



Model of King George's Dock and the Riverside Berths.

through Nos. 1 and 2 Kidderpore Docks and thence through a large culvert to King George's Dock, whence a certain proportion will find its way back to the Hooghly through losses incurred from leakage and working the locks. It is anticipated that the amount of silt deposited can be easily dealt with by dredging.

Most of the land between King George's Dock and Kidderpore Docks is owned by the Commissioners. Part of it is occupied by the Commissioners' own buildings, e.g., warehouses, workshops, employees' quarters, etc., and most of the remainder is leased out. A considerable number of large firms lease land or godowns (warehouses) from the Commissioners, and the names of many well-known firms such as Messrs. Braithwaite and Co., Ltd., Dorman Long and Co., Ltd., Brooke Bond and Co., Imperial Chemical Industries, Shaw Wallace and Co., Ralli Bros., etc., appear in their rent roll. The latest arrivals in the Dock area are Carrera's, Ltd., who have rented a large four-storeyed warehouse for the manufacture of cigarettes, and the Metal Box Co.

The Commissioners, in addition, own a considerable amount of land on the Howrah side of the river and also on the Calcutta side north of the Howrah Bridge. The rents obtained from these estates, including warehouses, average about £300,000 per annum and form a valuable source of revenue.

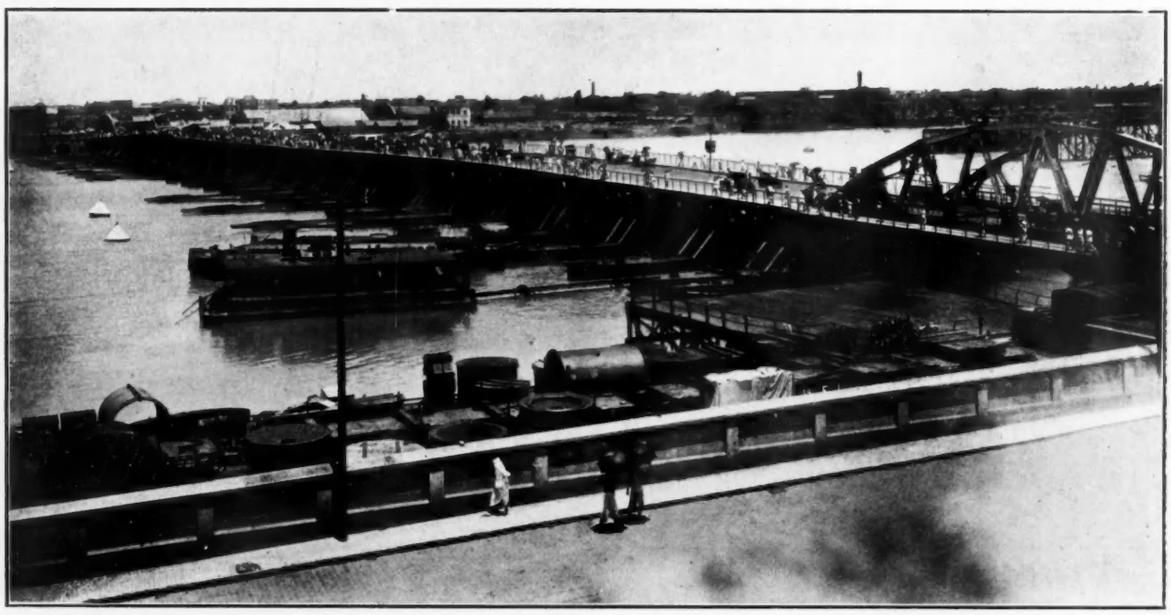
Apart from the warehouses which the Commissioners lease out for general purposes, they have provided over 460,000 sq. ft. of accommodation for the storage of tea in two large four-storeyed warehouses situated between the two dock systems, and for the storage of grain and seeds 34 single-storeyed warehouses, with a total covered floor space of rather more than 1,000,000 sq. ft., at Kantapukur, immediately to the east of No. 2 Kidderpore Dock.

Largely owing to the presence of the docks, Kidderpore has grown during the last 50 years from a small village to a considerable suburb of Calcutta, from which it is separated by Tolley's Nullah and the Maidan—a large open park, several miles in extent and dotted with fine clumps of trees. The Strand Road runs along the river bank between Kidderpore and the Calcutta jetties, and this part of the river frontage is not used for port purposes. The upstream end of the port is connected with the dock system only by the Strand Road—and other roads across Tolley's Nullah—and by the Commissioners' railway system.

Fort William, in which a British regiment is always stationed, is situated close to the river about one mile north of Tolley's Nullah. A short distance above the fort there is a floating landing stage known as Outram Ghat, which is chiefly used by the Rangoon Mail steamers, of which there are three inward and three outward sailings each week. The Calcutta Jetties begin some distance above Outram Ghat. These jetties are the oldest part of the port and were taken over from Government by the Commissioners in 1870, when the Commission was first instituted. There are nine jetties with a total length of 4,735-ft., but only four of them are available for ocean-going steamers, because three have been put out of commission as a measure of economy and the remaining two are reserved entirely for boat traffic. Of the seven steamer jetties, three are provided with two-storeyed and four with single-storeyed sheds, all of which are equipped with 35-cwt. and 5-ton cranes.

The jetties have been used entirely for imports for many years, and in boom periods very large quantities of goods, sometimes amounting to well over 1,000,000 tons per annum have been handled at them. They are difficult to work effectively, however, as the space available is extremely limited and any extension of storage space in busy periods is quite impossible. It is also difficult to ensure that goods are removed expeditiously because a very large proportion of imports are taken away from the Commissioners' premises in buffalo and bullock carts which move slowly, are difficult to regulate and therefore tend to cause added congestion.

It is probable that the Calcutta jetties will eventually be reserved entirely for the coasting trade and it is possible that when the time comes for extensive repairs to them it may be considered advisable to close them down entirely and to



Howrah Bridge: The Floating Bridge across the Hooghly, which connects Calcutta with Howrah.

The Port of Calcutta—continued

transfer the whole of the import trade to King George's Dock.

Between the jetties and Strand Road there are four large three-storied warehouses with a total floor area of 93,000 sq. ft. for the storage of imports. A certain amount of space in these warehouses is reserved by the Commissioners and the remainder is leased out to tenants.

A considerable number of moorings are provided in the stream between the entrance to the Kidderpore Docks and the north end of the Calcutta jetties. The method of mooring ships in the Hooghly is somewhat unusual. All vessels lying in the stream are moored fore and aft by crossed cables. The use of four cables is considered to be necessary owing to the strong tidal currents and the seasonal occurrence of bore tides and sudden violent squalls of wind, usually followed by torrential rain, known as Nor'Westers which occur several times a month between March and June and are generally welcomed as providing a short respite from the sticky heat of these months.

The river moorings are occupied by vessels waiting for a berth at the jetties or in the docks, or who wish to load or discharge cargo overside into boats. There is a very considerable boating business in the port and in busy years more than 4,000,000 tons of imports and exports have been handled overside. Almost all imports of salt and timber and a large proportion of the imports of rice, betel nuts, heavy oils, soda, sugar and wheat are discharged in this way. The most important of the exports shipped in the stream are bunker coal, gunnies and raw jute. Of the two latter commodities only a comparatively small proportion is shipped over the quays.

At the upstream end of the Calcutta jetties there is a heavy lift yard and immediately above that lies the Howrah Bridge. The Howrah Bridge is a wooden structure floating on pontoons, which rise and fall with the tide, and was built in 1876 as a temporary makeshift. The centre span of the bridge can be removed for the passage of steamers, but this is inconvenient as road traffic is, of course, held up while the bridge is opened. Night openings are arranged for whenever possible but this cannot always be managed because the bridge can only be opened at or near slack water. Ocean-going steamers no longer proceed above the bridge and, as inland steamers only require 29-ft. of head room, it will not be necessary to provide an opening span in any new bridge that is built.

The proposal to build a new bridge across the Hooghly has been under discussion for the past 20 years or more and several committees have sat to discover the best type of bridge and the means of financing its construction and subsequent maintenance. The first and most controversial point to be decided was whether a bridge constructed on piers in the bed of the river could safely be permitted, or whether some type of single-span bridge must be insisted upon. It was ultimately decided that piers could not be permitted without some risk of the alignment of the deep channel being altered and that such a risk, however remote, could not be justified, because, if the course of the deep channel was diverted from the entrances to the docks, the fate of Calcutta as a port might easily be sealed.

It appears likely that work on a new bridge a short distance above the existing one will be started in the comparatively near future and that a type of cantilever bridge will be chosen.

Above the Howrah Bridge the Commissioners for the port are the owners of land on the left bank of the river as far as Cossipore, a distance of 3 miles. Much of this river frontage is occupied by wharves over which pass a very considerable traffic in straw, bricks, tiles, betel nuts, jute, timber and other miscellaneous goods, totalling, in some years, as much as 200,000 tons and the remainder by bathing ghats and a large burning ghat where the Hindu population cremate their dead. The land immediately behind the wharves is also owned by the Commissioners. Most of it is leased to tenants who have constructed warehouses and depots for general merchandise.

The present slump has had a disastrous effect on the trade of the port. All the chief exports are primary commodities and these show a large falling off, while the reduced purchasing power of the people of India is reflected in the reduction in the tonnage of manufactured imports. A further factor towards the reduction of the maritime trade of Bengal has been the action of Government in placing a heavy duty on imported sugar and molasses which has had the effect of practically killing the sugar trade with Java. Railway competition has also resulted in a certain amount of coal for coastal ports, which would ordinarily have been sent by sea, being diverted to rail.

The three statements immediately below show the number and total gross tonnage of ships entering the port, the total quantity of goods handled, and the tonnages of the chief imports and exports in 1928-29—the last of the prosperous years—and 1931-32, which is the latest year for which figures are available:—

Number and Tonnage of Ships entering the Port.

	1928-29	1931-32
Number of Ships ...	1,465	1,263
Gross Tonnage ...	7,976,074	7,034,511

TOTAL IMPORTS AND EXPORTS

	1928-29 Tons	1931-32 Tons
IMPORTS		
Jetties	1,049,668	380,324
Docks	1,164,631	586,902
Overside (including petroleum) ...	1,706,559	1,365,076
Total	3,920,858	2,332,302
EXPORTS		
Docks—General Exports	1,750,969	1,251,060
Docks—Coal	2,644,256	2,595,912
Overside	2,524,201	1,748,950
Total	6,919,426	5,595,922

CHIEF IMPORTS AND EXPORTS

	1928-29 Tons	1931-32 Tons
IMPORTS		
Betel Nuts	46,530	36,609
Cement	27,345	8,944
Cotton Piecegoods ...	116,025	80,239
Glassware	29,950	11,841
Hardware	48,589	31,213
Iron, wrought	274,544	1,399
Iron, galvanized	157,230	26,062
Machinery	103,410	41,748
Motor Cars	38,619	10,186
Oils	58,485	45,196
Petroleum	468,106	385,247
Rice	473,410	186,812
Salt	499,071	475,567
Soda	34,962	35,201
Sugar and Molasses ...	423,325	216,014
Timber	106,455	57,363
Wheat and Seeds	401,492	213,909
EXPORTS		
Coal	3,238,383	2,894,309
Gunnies	1,016,005	766,053
Hides	26,509	11,326
Pig Iron	465,151	357,030
Jute	852,040	543,163
Shellac	47,732	28,123
Manganese Ore	378,903	150,365
Myrabollams	37,171	27,436
Rice	106,854	138,472
Seeds	143,745	136,006
Tea	120,268	105,014

Of the exports from Calcutta, excluding shipments to other ports in India, of which by far the most important commodity is coal, approximately 40 per cent. are sent to the United Kingdom, 11 per cent. to the remainder of the British Empire, 17 per cent. to other countries in Europe (of which Germany accounts for more than a third), 22 per cent. to other countries in Asia, chiefly Japan and Java, and 10 per cent. to America.

Most of the tea exported is shipped to the United Kingdom, but Canada, the United States, Africa, Australia and Russia all import appreciable quantities. Hides and skins go chiefly to Germany, Italy and Spain; manganese ore to the United Kingdom and Belgium; pig iron to Japan, the United Kingdom and the United States; and scrap iron almost entirely to Japan. More than half of the total quantity of jute exported is sent to the United Kingdom, but Germany, France, Belgium, Italy, Spain and the United States all take a certain quantity. Rice goes to Mauritius, Ceylon, South Africa, Germany, the United Kingdom and the West Indies; shellac to the United States, the United Kingdom, Germany and Japan; gunny bags to Australia, the United Kingdom, Java, China and the West Indies and gunny cloth to the United States and the Argentine.

Imports are chiefly from the United Kingdom and other European countries, Japan and the United States. The imports of cotton piece goods in 1928-29 from the United Kingdom were 491,000,000 yards and from Japan 111,000,000 yards. In 1931-32 the corresponding figures were 29,000,000 yards and 100,000,000 yards.

The great shrinkage in the tonnage of all the chief imports and exports shown in the above figures is reflected in the decreased income of the port. In 1928-29 the total revenue amounted to Rs. 341.83 lakhs (£2,563,625) and the total expenditure to Rs. 321.72 lakhs (£2,412,000), showing a surplus of Rs. 20 lakhs (£150,752) on the year's working. By 1931-32 the total revenue had diminished to Rs. 267 lakhs (£2,002,500) while expenditure had only decreased to Rs. 313.44 lakhs (£2,250,800), showing a deficit on the year's working of £248,300.

Revenue has since declined still further and, though recent figures are somewhat more encouraging, there is little evidence yet to show that better times are on the way. Every possible economy is being effected but the Port of Calcutta is doubly unfortunate in having to meet so severe a contraction in the volume of trade immediately after incurring very heavy expenditure on the construction of King George's Dock and the new 80-ft. lock entrance to the Kidderpore Docks.

The annual interest and sinking fund charges on the cost of King George's Docks alone amount to Rs. 54 lakhs (£405,000) and the total of interest and sinking fund charges payable by

The Port of Calcutta—continued

the Commissioners amount to Rs. 161 lakhs (£1,237,500) per annum. It is estimated that of every rupee/pound of revenue received, no less than 10 annas 6 pies/13 shillings and a penny halfpenny is spent in meeting charges on capital debt.

In common with other public bodies the Commissioners are in the unsatisfactory position of having access only to sources of revenue which are dependant on current conditions, while their expenditure to a very large extent is fixed for years ahead and cannot be reduced pari passu with reduction in trade. Apart from interest and sinking fund charges, which are referred to above, municipal taxes are constant, property must be maintained, and the expensive work of dredging, surveying, marking and buoying the Hooghly has to go on practically regardless of the number of ships entering the port; while the number of staff employed can only be slightly decreased with a decline in the tonnage of goods handled and any such decrease is to a very large extent confined to the lower-paid staff.

In order to meet the serious hiatus between income and expenditure that has developed in spite of all possible economies since the slump started, the Commissioners have been forced to increase their charges this year to bring in additional revenue to the extent of Rs. 25 lakhs (£187,500), but it is hoped that as soon as the volume of trade begins to revive it will be possible to withdraw these extra impositions.

The future of the port, like the future of everything else in India, is wrapped in uncertainty but it seems probable that under the reformed constitution it will be necessary to bring all major ports under the control of a central body, similar to the Railway Board, which will be influenced, if not bound, by the deliberations of local advisory bodies.

North-East Coast Notes

Signs of Trade Improvement.

THERE has been so much irresponsible writing and talking of trade revival, and so few signs of real improvement, that one is hesitant in expressing the opinion that at long last there is really an improvement in trade and industry on the North-East Coast. Having expressed the opinion, it may, perhaps, be well to support the statement with a few facts. In the first place, Tyne coal and coke shipments at the end of July had not only reached the figure for 1932, but even passed it. For the seven months the quantity shipped was 7,177,113 tons, compared with 7,170,825 tons last year. It is significant that the greatest headway had been made recently, at a time when domestic consumption had been reduced to a minimum by successive heat-waves. A second point to be noted is that there is more tonnage moving, and, although there is not much decrease in idle tonnage, vessels are every now and again going into commission. Further, according to Lloyd's latest shipping return there is some increase in tonnage under construction. On the Tyne at the end of June there were 3 vessels building of 14,705 tons, an increase of about 4,000 tons on the March quarter; on the Wear there were 6 vessels of 16,040 tons, 3 vessels and 7,500 tons more than in March; at Hartlepool the figures were unchanged, but on the Tees there was an increase of 7 vessels and 6,430 tons, the tonnage under construction being 16,430, representing 9 vessels. To this array of facts may be added the bare statement that on August 10, vessels aggregating 87,000 tons were in the London and North Eastern Railway Docks at Middlesbrough loading or discharging cargo; the largest number of vessels for at least six months. In connection with the local coal trade it may be noted that in the hope of more trade coming to the Northern Counties, the quota for the collieries in Northumberland has been raised by 300,000 tons, and that for those in Durham by 250,000 tons.

Sir Arthur Sutherland's Opinion.

The above contentions were supported by Sir Arthur Sutherland, deputy chairman of the Tyne Improvement Commission on two recent occasions. Addressing representatives of the Durham and Northumberland coal owners on July 24, when they had made an inspection of the river at the invitation of the Commissioners, Sir Arthur said: " There is something to give us heart to-day when we know that the laid-up tonnage is somewhat down and there are signs of recovery in the shipment of coal." Proposing the toast of the coal owners of both counties, Sir Arthur said they were entertaining their best customers, for the coal trade provided 70 per cent. of the Commission's income, or £350,000. He regretted that on the first six months of the year the shipments were down 3 per cent., or 190,000 tons, but it was pleasing that during the last month trade had improved, and the prospects for the next month or so were good.

" We have had advices," he added, " that a large number of boats are coming in for bunkers, and we are getting a good name for the re-conditioning of ships and the installation of superheaters and other devices to save coal." (Cries of " Shame," and laughter). " Some say ' Shame,' " said Sir Arthur, " but if they could not reduce the coal consumption they would not run at all and they would use no coal at all." As to laid-up tonnage, he gave figures that showed that in August last year the peak was reached—180 vessels, of 391,000 registered tons—while that day the figures were 133 vessels of 275,000 tons.

Mr. Ridley Warham, in responding, paid a tribute to the work of the Tyne Commissioners. He said the demand for coal at home was being maintained and increased, and he was hopeful that the first fruits of the Scandinavian reciprocal agreements would soon be seen.

A few days later, Sir Arthur Surtherland, when welcoming the members of Newcastle and Gateshead Chamber of Commerce, who at the invitation of the Tyne Improvement Commission had inspected the river, again referred to the improvement in the Tyne fuel shipments. He said the Commission had not been behindhand in keeping the river up-to-date, so as to anticipate good times. At Howdon they had one of the best staiths in the country, where they were trying to ship coal with a minimum of breakage. They were treating for the purchase for Tyne Dock last year, and it would be useful, principally, for large steamers. If they only had better facilities for large steamers they might bring some of that trade here. So if the Railway Company offered the dock at the proper price, something might happen. Meanwhile they had got Jarrow Slake, which only needed dredging, and they might put staiths there, and so do without Tyne Dock.

Blyth's New Record.

Blyth has for long been one of the bright spots as regards trade on the North-East Coast, and were able to announce a record day's shipment on July 21st, the total being 26,553 tons, the previous best figure for a day being 25,573 tons.

For the half-year ended June 30th, the shipments were 2,645,400 tons; 1932, 2,433,763 tons; 1913, 2,337,443 tons. The shipments for the half-year show an increase of 9 per cent. on 1932, and 13 per cent. on 1913. At the conclusion of the business of the Blyth Harbour Commission, the chairman welcomed several guests, who afterwards had lunch with the Commissioners and accompanied them on their inspection of the Harbour. Amongst those present were:—Mr. T. Hornsby, divisional general manager, London and North Eastern Railway, York; Mr. A. E. Bell, Pyman, Bell and Co.; Mr. R. I. James, chairman of the North of England Shipowners' Association; Mr. J. G. Elder, chairman of the Shipbrokers' Association; Col. Henderson, secretary of the Shipbrokers' Association; Mr. G. S. F. Ritson, secretary of the Newcastle and Gateshead Chamber of Commerce, and the Coal Exporters' Association; and others.

Wear and Tees Trade.

Ald. F. W. Taylor, vice-chairman, presided at a meeting of the River Wear Commissioners, when it was reported that a contract had been placed with Messrs. Rolmac Ltd., of Lemington-on-Tyne, for the supply of 5,000 tons of rubble whinstone for the rubble bank at the new South Pier, Sunderland. The report of the Traffic Committee showed that for the six months ending June 30th, the coal shipments showed a decrease of 474,745 tons compared with the same period of 1932, the loadings having totalled 1,954,022 tons.

The improvement in the Cleveland iron trade is indicated by the fact that, despite the partial suspension of deliveries to Scotland owing to Glasgow holidays, shipments of pig iron from the Tees in July were heavier than those of any previous month, with the exception of March. A slight improvement in the export trade is indicated, the foreign shipments for July being the heaviest of the year, but the most satisfactory feature is the increasing demand for local iron from South Wales. More iron was shipped from the Tees last month than in any previous month during the past few years.

Hull and the Humber

Humber Conservancy Commissioners decide to make further contribution towards Trent Falls Improvement Works.

THE suggestion of the Aire and Calder Navigation that the Humber Conservancy Commissioners should make a further contribution to the cost of the Trent Falls improvement works has been under consideration by a special committee of the latter body with the result that the Board have decided to make an additional payment of £30,000 when the works are complete. The works consist of the construction of river walls at the confluence of the Trent and Ouse, where they form the Humber estuary and are known locally as the Fish Tail, and these are now in an advanced state. Unfortunately, unforeseen difficulties have been encountered in carrying out the work and the original estimate has already been exceeded and the sum of £113,000 is required to complete the walls within the jurisdiction of the Humber Conservancy Board. Already the Board have contributed £76,000 in respect of this work, and it was suggested that they might see their way to contribute up to half the additional cost, viz., £56,000. The Board, however, while entirely sympathetic and appreciative of the benefit already manifest to the channels of the Trent and Upper Humber, have not seen their way to provide the full amount asked for, but have agreed to the lesser sum of £30,000, making in all a contribution of £106,000.

The special committee reported that it was assumed that the Aire and Calder Navigation's application to Parliament for an extension of time would include a provision to authorise the Conservancy Board to make the suggested additional payment; for adequate safeguards for the completion of the works and for the protection of the interests of the Board and of navigation in general. The Committee in their report reviewed the circumstances in which the Board agreed with the Aire and Calder Navigation that the works intended to train the rivers Ouse and Trent, at Trent Falls, into one united channel should be carried out by the Navigation at a cost to the Board not exceeding £76,000. As long ago as 1923 the Board received a memorial on behalf of the London, Midland and Scottish Railway, the Aire and Calder Navigation, the Goole Steamship Owners' Association, the Goole Chamber of Commerce and the Urban Council, directing attention to the necessity for improvements in the Upper Humber. In 1926 the Aire and Calder Navigation received Parliamentary sanction to carry out the works which were required to complete by July 15th, 1934. It has, however, been found impossible to finish the improvement within the statutory period, and the situation is that if the walls are to be built to their full height it will be necessary for application to be made in the next session of Parliament for an extension of time. The revised estimate of the cost of the works to be submitted to Parliament is £189,000, or £113,000 more than the original estimate.

The Finance Committee reported that the Conservancy Board would be able on completion of the works to make a payment of £30,000 and that the income would be sufficient to meet the expenditure without the need for raising the shipping dues. The recommendation to make the additional payment was adopted by the Board on the proposition of Mr. J. H. Fisher, J.P. (who presided), seconded by Mr. J. Bentley Bennett (Goole). A question as to safeguards was raised by Mr. W. Minnitt Good, and Mr. Fisher said that nothing further had been mentioned in the communications than appeared in the minutes. He added that the proposal to make a gift of what Mr. Good had described as a handsome sum to help the Aire and Calder Navigation over a difficulty emanated from the members of the Shipping Committee who paid the dues. The Aire and Calder Navigation have already spent a considerable sum of money in carrying out river improvements within their own jurisdiction and have exercised their borrowing powers to the full extent, viz., £490,000.

Hull Corporation decide against buying Earle's Shipbuilding Yard.

The proposal that the Hull Corporation should purchase the estate known as Earle's Shipbuilding Yard on the north bank of the Humber with the object of building a large dry dock and of carrying out ship repairing has fallen through. A special committee was appointed to negotiate with National Shipbuilders' Security, Ltd., for the acquisition of the land and equipment, and as the result of certain interviews the committee came to the decision that no good purpose would be served by the Hull Corporation further considering the proposal at the present time, and the company has been informed to that effect with the intimation that if, at any time, they have an offer or a desire to sell at a reasonable site value they might " with advantage " communicate with the Town Clerk. A letter on behalf of National Shipbuilders' Security received by the special committee stated that the publicity which had already been given to the sale prevented any lump sum price either being put on or agreed to for the undertaking at that late stage. Mr. Barr, for the company, was not in a position to give a rock bottom price invited by the Corporation as matters then stood, but after investigating the site and value jointly with the auctioneers it had been put down at about £60,000, which included the permanent buildings on the site with certain exceptions. On the basis of 26½ acres the price worked out at 9s. 4d. per square yard. The equipment of the shipbuilding yard and engineering shops were recently sold at public auction.

Improvements at Bridlington Harbour.

The scheme of improvements undertaken by the Bridlington (East Yorkshire) Harbour Commissioners has been advanced a step further. A contract for re-decking the South Pier has been entered into with Messrs. Sampson and Son, whose tender of £1,090 was the lowest of three submitted. It is hoped that in doing this work the South Pier will be strengthened and the harbour facilities improved. The repair of the North Pier was recently completed by Messrs. Smallwood and Son (Bridlington) and it was stated by the chairman of the Works Committee (Mr. S. Charlesworth) that the pier is now in a sounder condition than it had been for many years. The Commissioners at their meeting towards the end of July unanimously expressed their gratitude to Mr. J. C. Lister, of Rotherham, who recently gave £130 to provide a new electric fog signal for use at Bridlington Harbour. The new signal will be very much more effective and more useful to mariners than the old one and will obviate a great deal of hand labour in the open air during unpleasant weather conditions. A resolution (moved by Major Lawson) was also passed thanking the chairman (Dr. T. C. Jackson) for the valuable services rendered by him to the Commissioners in the negotiations with the Bridlington Corporation in connection with that body's Bill and in particular in watching the interests of the Harbour Commissioners, followed by the happy result that it had not been found necessary to lodge a petition with either of the Houses of Parliament against the Bill. Mr. Charlesworth seconded, and Dr. Jackson, in reply, said that he had shared the work with a sub-committee and the clerk (Mr. G. Hankinson) and equal credit was due to them. Although neither side had got all they wanted, he believed that each now understood the other better, while the Commissioners had fulfilled all their duties and obligations in that they had preserved the ancient rights and privileges of their very ancient body.

New Slipway at Flamborough Head.

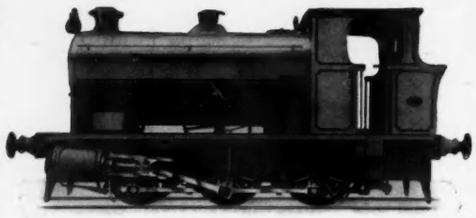
The failure of the fishermen to fulfil their promise to subscribe to a fund against the cost of making a slipway at Flamborough Head, was stated at a meeting of the North Eastern Sea Fisheries' Committee to be one of the reasons why the Development Commissioners could not make a grant towards its repair. The Fisheries' Committee have, however, agreed to make a grant of £100 and to lend a further £100, so that some part of the work may be carried out. The new chairman of the Flamborough Harbour Commissioners has undertaken to pay a certain sum from their own funds for the work.

Completion of the Kusten Canal

Work on the connecting stretch of the Kampe-Dorpen-Kanal from kilometre 23.0 to kilometre 28.9 has now been commenced.

West of the district road Dorpen-Aschendorf, in the immediate neighbourhood of kilometre 24.0 of the Kustenkanal excavation has been commenced for continuing the canal to the terminus of the section already completed at the outlet building at kilometre 23.0. On the east side the canal path cuts through the railway line Munster-Emden. After the banking of the new dam, the railway will be shifted by about 30 metres to the west of its old position.

The shifting of the railway further necessitates a massive railway bridge which is to cross the new Kustenkanal without impeding shipping. Parallel with the railway bridge a road bridge will be necessary for the road Dorpen-Aschendorf to be carried over. It will have the ordinary width of 40 metres. At the east of the estuary of the Kustenkanal it crosses the second district road Dorpen-Heede. Besides the present ones it will be necessary to construct a massive road bridge over the completed section of the canal.



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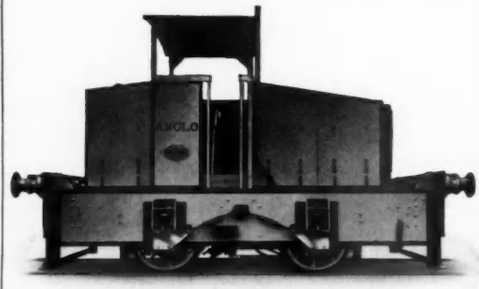

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350-Tons Floating Crane used for the construction of the Harbour Pier of Verdon
(see article January Number, 1933).

Dredging plants

Consideration of the Diesel-engined Locomotive for Dock Shunting or other Heavy Shunting Duties

By A. O. HELPS, A.M.I.Mech.E., M.I.Struct.E., Mechanical Assistant to the Port of Bristol Authority

THE rapid advance of the Internal Combustion Prime Mover, and particularly of recent years that of the Diesel engine, is unquestionably one of the most noteworthy features of modern engineering progress. At present this is particularly noticeable in the field of road locomotion; there has also recently been a tendency to apply the Diesel or Diesel-Electric Prime Mover to the railways, and in reports which have appeared in the press attention has usually been drawn to the **saving of fuel consumption**, and it has repeatedly been stated that savings of 50 per cent. to 70 per cent. in cost of fuel have been effected. This is quite a true, but at the same time misleading, statement, as there are other very important items to be considered before the **overall saving** can be gauged, viz.:—

(1) The difference in initial cost, which, power for power, is considerable.

(2) The comparative lubricating oil costs, a point seldom mentioned other than in a misleading manner, such as stating: "The lubricating oil consumption may be taken as 2½ per cent. that of the fuel oil consumption," which sounds quite a small amount but, as the cost of fuel oil to lubricating oil varies as 4½d. to 3s. 4½d. per gallon, it will be found that the lubricating oil cost may be as high as 30 per cent. of the fuel oil cost.

(3) The increased cost of maintenance. (This, I think, will be generally agreed.)

With regard to (1) above, i.e., the difference in initial cost, the writer would like to quote statements made by Lt.-Col. L. F. R. Fell in his paper entitled "The Compression Ignition Locomotive and its Applicability to British Railways."

Colonel Fell says:—

(a) "It has been shown that for main line express passenger and goods services an addition of about £20,000 and £13,000 respectively to the first cost of each locomotive would be involved. This is prohibitive and at once eliminates the oil engine for main line service.

(b) "For intensive suburban service, moreover, it is shown that the maximum economical power-weight ratio for an oil-electric unit would be insufficient to compete in speed with simple electric traction, and this sphere of service is also ruled out of consideration.

(c) "But for passenger trains on lines where the normal train does not exceed about **150 tons** in weight and a speed of **60 miles** per hour on the level the advantage seems to be very heavily in favour of diesel electric traction.

There, however, remains a sphere of operation not mentioned above, viz., industrial shunting or dock shunting with trainloads of 500 tons and speeds of 8 to 15 miles per hour. The writer had noticed that practically all comparisons as to relative running costs were vague and misleading.

Many authorities and the engine-makers confine themselves to such statements as "There has been a saving of 50 per cent. to 70 per cent. on the fuel costs," or "The operating costs have been 50 per cent. those of steam." There have been very few statements giving true overall running costs, and as a point of personal interest the writer decided to look into the question of overall costs on heavy shunting duties, and is of the opinion that his findings may be of interest to any authority considering the installation of diesel-engined locomotives for such duties.

From Colonel Fell's remarks it will be readily appreciated that **each case must be treated strictly on its own merits**, and the final and important decision immediately becomes whether the increased **initial cost, depreciation and maintenance costs** will be covered by an **increased commercial efficiency**.

The case on which it is desired to make the comparison of overall running costs is that in which a good day's work of shunting is performed with trainloads of 500 tons weight at speeds of 8 to 15 miles per hour. Such a condition represents docks, colliery or steelworks requirements.

Such industrial shunting service being of an intermittent nature appears at first sight to be admirably suited to the employment of a diesel locomotive as stand-by fuel and preparation time, etc., is eliminated. There is, however, as previously stated, the initial cost to be considered, and it is often found on analysis that the mean load factor is so small that economies gained in running costs are offset by the interest and depreciation of the more efficient, but also more expensive, diesel engine.

We will now compare the running expenses and overheads of a popular-size dock locomotive with an equivalent size of diesel-engined locomotive.

The proportions of the steam locomotive are as under:—

Cylinders: 14½-in. × 20-in.
Coupled Wheels: 3-ft. 3-in. diameter.
Working Pressure: 160 lbs. per sq. in.
Tractive Effort at 85 per cent. boiler pressure = 14,663 lbs.
Total Heating Surface: 644 sq. ft.
Grate Area: 11 sq. ft.
Volume of Firebox: 46 cu. ft.
Weight of Locomotive in running order: 34 tons.
Maximum maintained speed—injector off: 8.5 m.p.h.
Maximum maintained speed—injector on: 6 m.p.h.

The daily fuel consumption of a steam locomotive in dock service is dependent mainly upon the percentage of total time the locomotive is in operation and the ratio of the average load to the maximum load.

In a railway yard or large industrial works or docks a shunting locomotive is under load for a proportion only of its working period, and when under load is not hauling at its maximum capacity except at very infrequent intervals. The result is that if the total work done by the engine during the day is compared with the total work of which it is capable, it will be found that the former is approximately 20 per cent. to 25 per cent. of the latter, that is, the average b.h.p. expended throughout the day is 20 per cent. to 25 per cent. the full load b.h.p. capacity, and the overall load factor would be 20 per cent. to 25 per cent.

We will therefore make the following assumptions, which will apply to both types of locomotive.

Working day to total 9 hours, as follows: 3 hours heavy duty 50 per cent. load factor, 2 hours light duty, 4 hours stand-by duty.

It will be found later by calculation that the above assumption gives an average load factor of 25 per cent., and there is very close agreement between the calculated and actual observed fuel consumption per day for both types of locomotive.

In order that the daily fuel consumption may be estimated, Fig. 1 has been compiled, which shows the pounds of fuel burnt at various evaporative power of the boiler, together with the overall boiler efficiency at various firing rates.

The calorific value of coal has been taken as 14,000 B.T.U.'s per pound.

The maximum evaporation of the boiler is attained when the fuel consumption reaches 1,430 pounds of coal per hour, the amount of water evaporated at this rate being 6,780 pounds from feed temperature of 50 deg. F. to steam at 160 pounds per sq. in. This is the maximum rating of the boiler with the injectors in operation, starting with a full glass of water the engine would run 6 minutes with injectors shut off, under which conditions the maximum rate of evaporation would be increased by 37 per cent.

The tractive effort of the steam locomotive at various speeds will be clearly seen by reference to Fig. 2, which shows:—

(a) The available maximum horse-power at rail (i.e., tractive effort h.p.) for speeds up to 16 miles per hour based on the maximum continuous evaporation at the boiler of 6,780 pounds per hour of water with feed temperature at 50 deg. F.

(b) The available tractive effort at speeds up to 16 miles per hour.

Effect of Load and Speed on Steam Locomotive.

It is obvious from Fig. 1 and Fig. 2 that the efficiency varies widely according to the conditions of operation. The available h.p. at full evaporation, continuous rating varies from 165 h.p. at 4 miles per hour to 233 h.p. at 16 miles per hour.

Still more important is the effect of the working load on the boiler performance. If we take the **average duty** speed of 8 m.p.h. it will be seen from Fig. 2 that the maximum continuous h.p. at this speed is 190 h.p. at rail, the corresponding tractive effort equals 8,850 pounds. The coal consumption under continuous operation at this h.p. would be 1,430 pounds per hour and the water evaporation 6,780 pounds, giving a fuel consumption of 7.5 lbs. of coal and 35.7 lbs. of water per rail h.p.

Consideration of the Diesel-engined Locomotive for Dock Shunting or other Heavy Shunting Duties

FIGURE 1 STEAM LOCO INDUSTRIAL ENGINE CURVES SHOWING EVAPORATION PER POUND OF COAL FIRED AND OVERALL BOILER EFFICIENCIES AT VARIOUS FIRING RATES

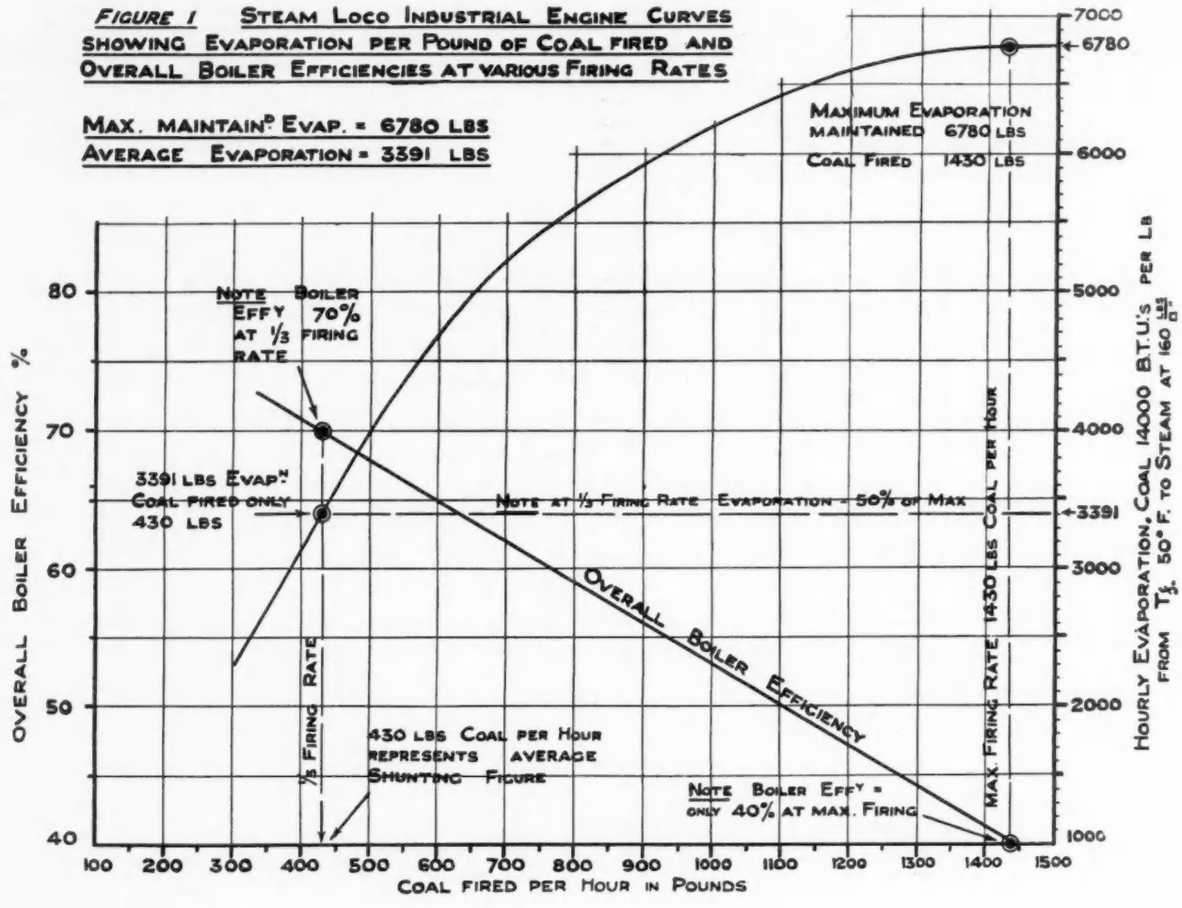
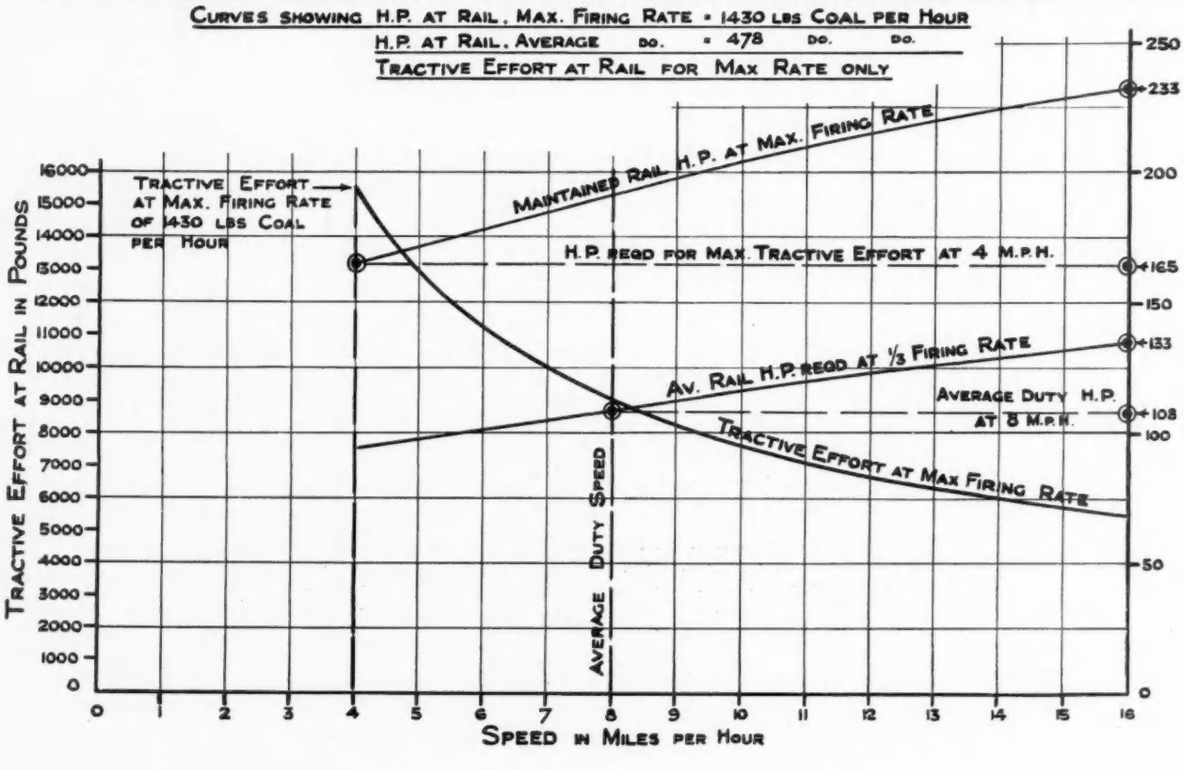
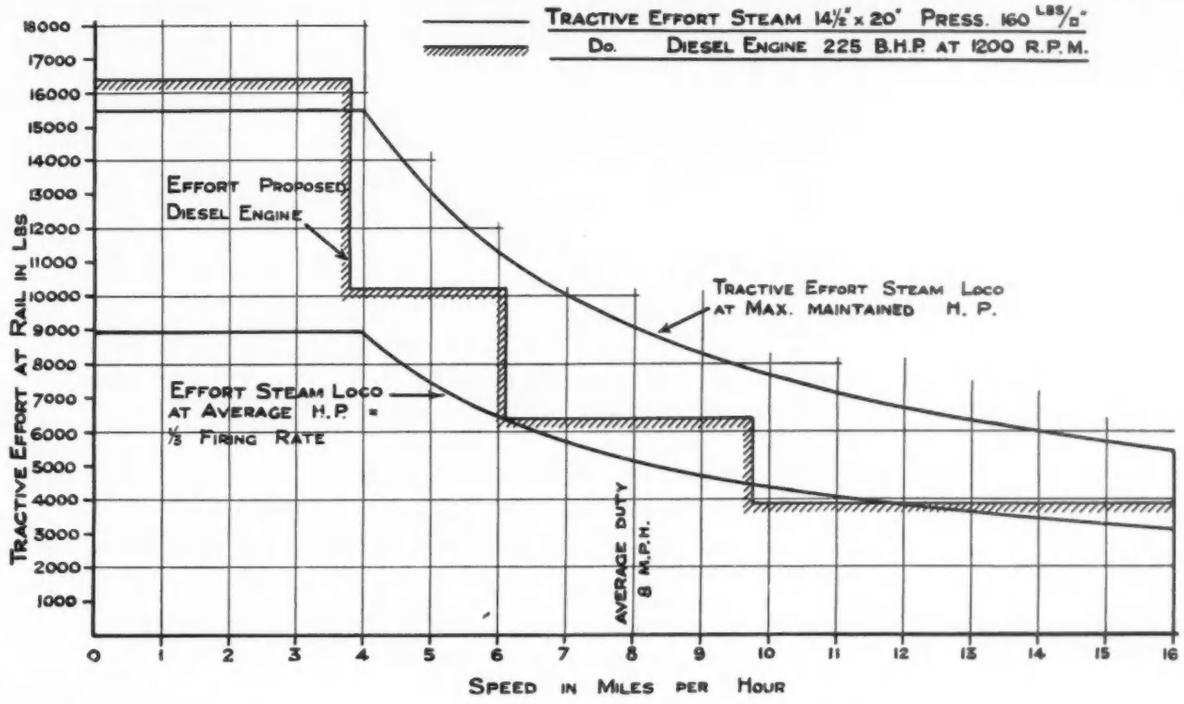

MAX. MAINTAIN^D EVAP. = 6780 LBS
AVERAGE EVAPORATION = 3391 LBS
MAXIMUM EVAPORATION MAINTAINED 6780 LBS
COAL FIRED 1430 LBS
NOTE BOILER EFFY 70% AT 1/3 FIRING RATE
3391 LBS EVAP^N COAL FIRED ONLY 430 LBS
NOTE AT 1/3 FIRING RATE EVAPORATION = 50% OF MAX
OVERALL BOILER EFFICIENCY
1/3 FIRING RATE
430 LBS COAL PER HOUR REPRESENTS AVERAGE SHUNTING FIGURE
NOTE BOILER EFFY = ONLY 40% AT MAX. FIRING
MAX. FIRING RATE 1430 LBS COAL PER HOUR
OVERALL BOILER EFFICIENCY %
HOURLY EVAPORATION, COAL 14000 B.T.U.'S PER LB FROM T/S. 50° F. TO STEAM AT 160 LBS/SQ IN
COAL FIRED PER HOUR IN POUNDS

FIGURE 2 STEAM LOCO "WILLIAM" RATING FOR 14½" x 20" SHUNTING ENGINE STEAM PRESSURE 160 LBS/SQ IN.
CURVES SHOWING H.P. AT RAIL, MAX. FIRING RATE = 1430 LBS COAL PER HOUR
H.P. AT RAIL, AVERAGE DO. = 478 DO. DO.
TRACTIVE EFFORT AT RAIL FOR MAX RATE ONLY


TRACTIVE EFFORT AT MAX. FIRING RATE OF 1430 LBS COAL PER HOUR
MAINTAINED RAIL H.P. AT MAX. FIRING RATE
H.P. REQD FOR MAX. TRACTIVE EFFORT AT 4 M.P.H.
AV. RAIL H.P. REQD AT 1/3 FIRING RATE
AVERAGE DUTY H.P. AT 8 M.P.H.
TRACTIVE EFFORT AT MAX FIRING RATE
AVERAGE DUTY SPEED
TRACTIVE EFFORT AT RAIL IN POUNDS
SPEED IN MILES PER HOUR

Consideration of the Diesel-engined Locomotive—continued

FIGURE 3 COMPARISON OF STEAM AND DIESEL TRACTIVE EFFORT


TRACTIVE EFFORT STEAM 14½" x 20" PRESS. 160 LBS/□"
DO. DIESEL ENGINE 225 B.H.P. AT 1200 R.P.M.
TRACTIVE EFFORT AT RAIL IN LBS
EFFORT PROPOSED DIESEL ENGINE
TRACTIVE EFFORT STEAM LOCO AT MAX. MAINTAINED H. P.
EFFORT STEAM LOCO AT AVERAGE H.P. = ⅓ FIRING RATE
AVERAGE DUTY 8 M.P.H.
SPEED IN MILES PER HOUR

Average Mean Load Factor.

In actual practice, however, the maximum tractive effort is rarely required, and from numerous steam engine data the average output when running on heavy shunting duties is rather over one-half the continuous maximum rating which can be comfortably maintained, and the fuel consumption under this condition is usually about one-third the maximum fuel consumption.

MEAN LOAD FACTOR.
Taking the average speed 8 m.p.h. and assuming 50 per cent. Load Factor.

AVERAGE H.P.
Then Average H.P. at Rail = $\frac{190}{2}$ = 95 H.P. approx. at 8 m.p.h.

AVERAGE EVAPORATION.
Average Water Evaporation = $\frac{6780}{2}$ = 3,390 lbs.

We can therefore now obtain the average coal fired per hour from Fig. 1 at 3,390 lbs. evaporation; this is found to be about 430 lbs. per hour.

It will be seen from Fig. 1 that by halving the h.p. demand and, with it, the evaporation; we have reduced the coal consumption from 1,430 lbs. to 430 lbs. per hour and increased the boiler efficiency from 40 per cent. to 70 per cent. At these rates the boiler is evaporating 9½ lbs. of water from and at 212 deg. per lb. of coal, a very good performance for this type of boiler.

We have therefore established the following points:—

1. The average h.p. required at rail for our required duty is approximately 95 h.p.; this will be slightly modified later from Fig. 2.
2. That under this load the coal fired per hour is 430 lbs., or, rather, let us take one-third the maximum firing rate, viz.:— 478 lbs. per hour.

AVERAGE COAL FIRED PER HOUR.
Coal per hour at average duty = 478 lbs.

We can now estimate the running cost of the steam locomotive. It will be noted that the driver's wage has been omitted, as it is common to both types of locomotive. The steam engine, as a rule, has an additional man on the footplate —the fireman.

COST OF RUNNING STEAM LOCOMOTIVE.
Initial cost of Locomotive = £1,816.

Coal consumption per day of 9 hours—	
3 hours heavy duty 50 per cent. Load Factor at 478 lbs. per hour	1,434 lbs.
6 hours light duty and stand-by duty (2 light, 4 stand-by) at average of 1½ cwts. per hour ...	1,008 ,,
Lighting up	84 ,,
Total coal per day	2,526 lbs.

CHECKING LOAD FACTOR.
Maximum firing rate per hour, see Fig. 1 = 1,430 lbs.
Therefore 9-hour maximum consumption possible = 12,870 lbs.
Actual consumption per day = 2,526 lbs.
Therefore overall Load Factor for 9-hour day for steam engine
$= \frac{2526 \times 100}{12870}$ = 20 per cent. approx.

LOAD FACTOR = 20 per cent.

Note the observed average coal consumption over a period of one year works out at 1 to 1¼ tons per day, we will therefore accept the calculated daily consumption, 1.13 tons.

WATER CONSUMPTION (EVAPORATION PER DAY).

	gallons
3 hours at 3,390 lbs. per hour (50 per cent. Load Factor)	1,017
3 hours at one-third above value	339
Blowing off wastage	100
	1,456

Water at 2s. per one thousand gallons.

COST PER DAY—WATER FOR STEAM GENERATION = 3s. PER DAY.

	£
Coal, 1.13 tons per day at 23s. 3d.	394
Water for evaporation 1500 gallons a day at 2s. 1000 ...	45
Water for wash at 8s. per week average	21
Lubricating and Cylinder Oil, 12s. per week	31
Cleaning and wash out, 14 man hours per week	55
Maintenance	180
Interest on Initial Cost at 4 per cent. (cost £1,816) ...	72
Depreciation, 7½ per cent.	136
Fireman's wages	175
COST PER ANNUM (300 working days)	£1109

OVERALL EXPENSE STEAM LOCOMOTIVE = £1109.

The Diesel-engined Locomotive.

As will be seen from Fig. 2, the steam locomotive will give its maximum tractive effort at speed up to approximately four miles per hour, after which the tractive effort diminishes. The steam locomotive will also give a maximum output of 233 h.p. at rail at 16 miles per hour. It should be noted that these outputs are at the rail, and in order that the diesel locomotive may be of equal power, allowance will have to be made for loss in transmission of the power from the diesel engine to the rail.

It is unusual with the type of locomotive under consideration, i.e., mechanical drive, with clutch and four-speed gear box, to allow a loss of 20 per cent. in transmission with, say, 4 per cent. loss of power to drive radiator fan.

We will therefore assume a transmission efficiency of 75 per cent.

The type of drive selected is by means of fluid clutch and gear box giving four speeds with reverse in each direction, and final drive through worm to one driving axle, the wheels being side rod connected as for locomotive practice.

Consideration of the Diesel-engined Locomotive—continued

WHEN DEVELOPING THE SAME TRACTIVE EFFORT AS THE STEAM ENGINE AT 4 M.P.H., THE H.P. REQUIRED AT RAIL WILL BE 165.

Taking transmission efficiency as 75 per cent., the horse power required at Diesel will be $\frac{165}{.75}$ = 220 B.H.P.

AT SIMILAR AVERAGE DUTY TO STEAM LOCOMOTIVE AVERAGE SPEED 8 M.P.H.

Average H.P. at Rail obtained from Fig. 2 = 108 H.P.

Therefore Average H.P. required at Diesel = $\frac{108}{.75}$ = 144 B.H.P.

THEREFORE AVERAGE DUTY REQUIRED OF ENGINE AT AVERAGE REQUIRED SPEED OF 8 M.P.H. = 144 B.H.P.

The maximum H.P. at Rail given by the Steam Engine was 233 H.P. at 16 m.p.h.

In order for the Diesel Engine to produce this H.P. at Rail it would have to develop $\frac{233}{.75}$ = say 300 B.H.P.

Tractive Effort Calculations.

Assume four-speed gear box suitable speeds 3.8, 6.1, 9.75 and 16 miles per hour. Then taking the engine on the normal horse-power rating of 225 b.h.p. at engine and allowing transmission efficiency as 75 per cent. (Actually it would be higher on top gear.)

The Tractive Effort at Rails calculated from the old favourite

$$H.P. = \frac{TM}{375} \quad T = \frac{HP \times 375}{M}$$

at 3.8 m.p.h. $T = \frac{225 \times .75 \times 375}{3.8}$ = 16,500 lbs.

at 6.1 m.p.h. $T = \frac{225 \times .75 \times 375}{6.1}$ = 10,300 lbs.

at 9.75 m.p.h. $T = \frac{225 \times .75 \times 375}{9.75}$ = 6,400 lbs.

at 16 m.p.h. $T = \frac{225 \times .75 \times 375}{16}$ = 3,900 lbs.

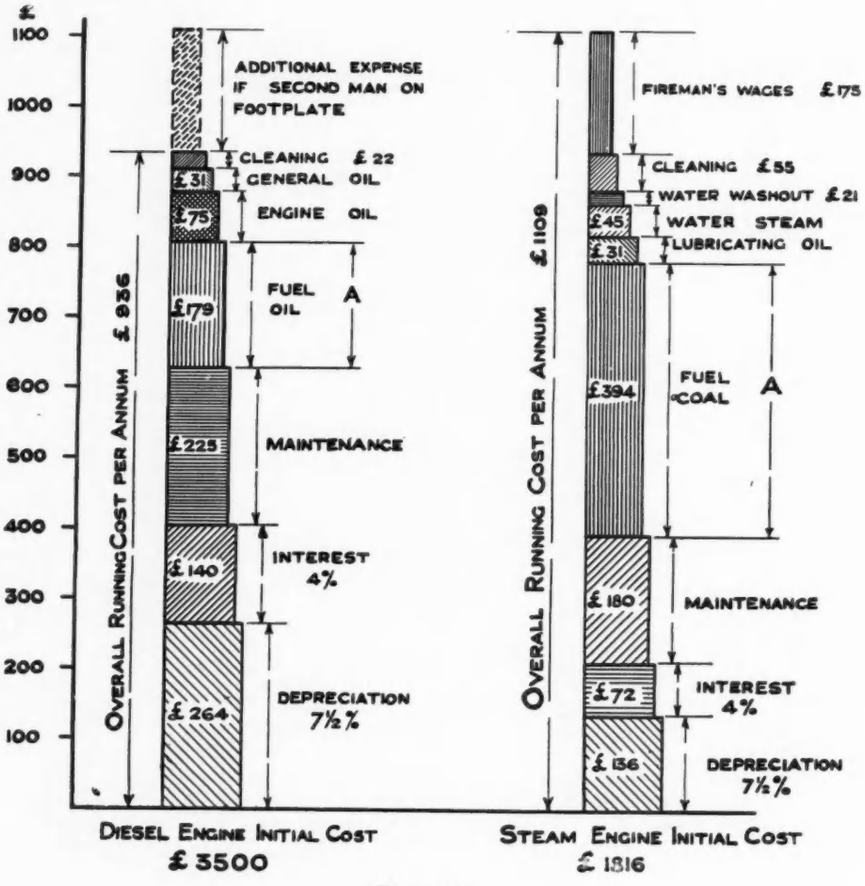


Figure 4.

If an engine of 300 b.h.p. was fitted to cope with this maximum condition it would mean that while the engine was running at its mean load factor of 144 b.h.p., which is the average running condition, the fuel consumption would be high as 144 b.h.p. represents only .48 the normal rating of a 300 b.h.p. diesel and a diesel engine becomes uneconomical below the half-load factor.

We will therefore consider a diesel engine of 225 b.h.p. with maximum rating of 250 b.h.p. This will easily cope with the 4 m.p.h. and the 8 m.p.h. conditions given by the steam locomotive, as will be seen from the above calculations, but will not give the maximum horse-power that the steam engine gave.

It will be found, however, that a diesel engine of this power will closely resemble the steam engine performance at the average working condition requiring a maximum horse-power of 133 h.p. at rail (see Fig 3).

It will be seen later that the initial cost is the principal obstacle in the way of adoption of the diesel engine. The price of diesel engines of similar rating vary considerably, and in order to make a fair comparison the average price for a suitable prime mover has been chosen.

The engine selected is a six-cylinder Beardmore developing 225 b.h.p. as a continuous rating and 250 b.h.p. as a maximum rating, both these ratings being taken at 1,200 r.p.m. The engine is of the four-stroke cycle with airless injection.

These figures check with the contractor's figures in his estimate.

The tractive capacities are shown on Fig. 3, on which the tractive capacity of the steam locomotive is also shown at both maximum output and at the average condition of .5 load factor and one-third firing rate.

It will be seen immediately that the proposed diesel engine does not come up to the steam locomotive at maximum load factor except at speeds up to 3½ m.p.h., where it has a higher tractive effort than the steam engine at full load factor. At the higher speeds it is much below the steam engine when compared to maximum tractive effort rating. The diesel engine however, compares reasonably with the average condition shown by the steam locomotive curve at .5 load factor, which is the average daily working condition.

This engine was put forward by the locomotive manufacturers to do the work of the steam locomotive, and as the price quoted is known and can be used for comparison, the writer has accepted this engine of 225 b.h.p., although, if he were actually taking the engine over, he would have specified, say, a 250 b.h.p. engine with maximum rating 275 b.h.p. in order to stiffen up the tractive effort at the higher speeds. This again is being very fair to the diesel engine, as a higher rating would increase the fuel per b.h.p. hour at average duty for the reason previously stated, and also the initial cost of the engine.

Consideration of the Diesel-engined Locomotive—continued

The tractive diagram for the diesel is drawn on the assumption that the torque is constant throughout the speed range. Actually this is not so, but in order to save time in discussion I will ask you to accept that shown as near enough for our purpose of comparison.

We are now in a position to estimate the running cost of the diesel-engined unit.

Assume the diesel locomotive to operate under similar load conditions as the steam locomotive.

The average h.p. delivered to the rails by the steam engine at 8 m.p.h. was 108 h.p. (see Fig. 2).

The engine will then be operating at full revolutions per minute in second gear, the transmission efficiency being 75 per cent.

The Engine will be developing $\frac{108}{.75}$ = 144 B.H.P.,

or .64 its normal rating.

The guaranteed fuel consumption for the engine is as follows: 1/1 load .44 lbs. per b.h.p. hour, 3/4 load .43 lbs. per b.h.p. hour, 1/2 load .46 lbs. per b.h.p. hour. (Note.—The fuel consumption rapidly increases as the load falls below 1/2 load condition).

Assume average duty, i.e., 144 b.h.p. at engine as .6 load rating of engine.

Then the average hourly fuel consumption will be .45 lbs. per b.h.p. hour, i.e., 144 x .45=65 lbs. per hour.

The idling fuel consumption is usually taken as one-fifth the consumption at normal full load.

Therefore consumption per hour = $\frac{225 \times .44}{5}$ = 19.8 lbs. per hour.

Lubricating Oil .012 lbs. per B.H.P. hour or, taking it as 2½ per cent. of fuel consumption at .44 lbs. per B.H.P. hour = $\frac{.44 \times 2.5}{100}$ = .011 lbs. of Lubricating Oil per B.H.P. hour.

The rate of lubricating oil consumption does not vary much between full load and half load condition.

Therefore Lubricating Oil per hour = 225 x .012 = 2.7 lbs. per hour.

A few words here with regard to the lubrication of this type of high speed, high efficiency, diesel engine. The "best oil is the cheapest." This type of engine is designed for high efficiency and small bulk, and the bearing pressures may be as high as 2,000 lbs. per sq. in. of projected area. Hence the absolute necessity of high-grade oil for this type of engine.

Prices were obtained for supply of this oil in fairly large quantities; two prices were submitted: Firm "A," 3s. 4½d. per gallon; Firm "B," 4s. 6d. per gallon (best grades).

Cheaper oil is on the market, but I do not consider it is an economy in the long run to use it.

Estimate lubricating oil cost on oil at 3s. 4½d. per gallon then

COST OF FUEL PER DAY.

FUEL OIL.

3 hours heavy duty at 65 lbs. per hour	195 lbs.
2 hours light duty half load or under at 30 lbs. per hr.	60 ,,
3 hours stand-by stopped	0
1 hour Engine idling	19 ,,
AVERAGE FUEL OIL PER DAY	274 lbs.

CHECKING LOAD FACTOR.

Maximum possible consumption of 225 B.H.P. Diesel Engine per hour at Full Load (.44 lbs. per B.H.P. hour) = 99 lbs.
Maximum ditto per 9-hour day = 891 lbs.
Calculated consumption per 9-hour = 274 lbs.

Therefore Load Factor $\frac{274}{891}$ x 100 = 30 per cent. approx.

Note.—The higher load factor at the Diesel Prime Mover for similar performance at rails compared with the steam engine is due to higher transmission losses. The transmission efficiency in this case being 75 per cent.

Price of fuel oil 4½d. per gallon, or 98s. per ton.

Lubricating oil cost per day:—Engine running 5 hours per day, therefore oil consumption per day equals .012 x 225 x 5 equals 13.5 lbs. per day equals 1.5 gallons per day at 3s. 4½d. per gallon; equals, say, lubricating oil 5s. per day.

OVERALL RUNNING COST OF DIESEL PER ANNUM (300 days).

	£
Fuel Oil, 274 lbs. per day at 98s. per ton = $\frac{274 \times 98 \times 300}{2240 \times 20}$	179
Lubricating Oil Engine, 300 days at 5s.	75
Gear Box and General Oil, 12s. per week	31
Cleaning	22
Maintenance (Steam 1.25)	225
Interest on Capital, £3,520 at 4 per cent.	140
Depreciation, at 7½ per cent.	264
OVERALL COST PER ANNUM	£936

	£
Cost of Steam per annum	1109
Cost of Diesel per annum	936
THEREFORE SAVING ON DIESEL PER ANNUM =	£173

There is therefore a saving of £173 per annum in favour of the diesel-engined locomotive provided that the services of the second man on the footplate are dispensed with, but for dock shunting duties it is very unlikely that this saving could be effected.

The saving of £173 per annum as shown is due to every fairness having been given the diesel engine job; I could have demanded a more powerful unit to give the same maximum tractive effort as the steam locomotive at 16 m.p.h. (see Fig. 3). Again the saving has only been effected by incorporating an engine of average cost and avoiding expensive refinements such as electrical transmission, which would have increased the first cost considerably and reduced the saving shown accordingly.

The figure taken for maintenance should, I think, have been a little higher, but due to lack of reliable information the figure taken was assumed.

It will be seen, therefore, that even allowing for the present low cost of fuel oil (4½d. per gallon) and the high thermal efficiency of the diesel engine compared with that of the steam engine, there is not a considerable saving, all things considered, if diesel engines be employed on duties of the type under consideration.

There is, however, another point to be noted by authorities considering the general employment of diesel instead of steam prime movers. The steam engine relies for fuel on coal, a national commodity, of which ample supplies are available, and the demand is decreasing, whilst the diesel engine relies almost entirely on imported fuel oil, a commodity of which the demand is increasing, and with an increasing demand established it is quite feasible that the present low price of fuel oil will be raised.

Whilst it is essential that experimentation should be carried out with the diesel, it is considered that the industrial steam locomotive, particularly that required for shunting service, could be improved in overall efficiency. The writer recently read a paper by Mr. T. Grimes given before the Institution of Locomotive Engineers in London entitled "The Geared Steam Locomotive," and he is convinced that this type of locomotive could be developed to show considerable saving in fuel and water costs compared with the direct drive type steam locomotive now in general use, and to compete on a more favourable basis with the fuel oil engine.

Our coal is a national asset which at the present time is greatly in need of an increased demand. The writer is fully aware that certain processes have been evolved to extract fuel oil from coal, but doubts whether they can compete in a satisfactory manner with the natural resources from which imported fuel oil is obtained. He further considers that every possible consideration should be given to the employment of British coal as a fuel, and that the coal industry should not be handicapped due to the engineer failing to increase, wherever possible, the efficiency of the steam engine and, more particularly, the industrial steam shunting locomotive.

In conclusion, I should like to thank Mr. T. Grimes, chief designer, Avonside Engine Co., Bristol, for his assistance in checking calculations, etc.

Good Business for the Port of Bristol.

The Port of Bristol offers unique opportunities for the extension and development of commercial undertakings on land adjacent to ocean docks. In addition to a number of valuable dock sites at Avonmouth, Bristol and Portishead, a large estate within shunting distance of the docks at Avonmouth has been acquired by the port authority for industrial development. This land, partly occupied by buildings readily adaptable to the requirements of a modern factory, is available to firms desirous of embracing the obvious advantages to be obtained by location at an up-to-date port. A good deal of optimism prevails consequent upon recent extensions by firms already situated on the Dock Estate at Avonmouth. These developments, in conjunction with the completion in due course of the large quayside mills now under construction should lead to a considerable influx of new traffic. The oil trade of the Port will be given further impetus by the recent decision of Trinidad Leaseholds, Ltd., to erect an extensive installation at the specially-designed oil basin at Avonmouth. On the other side of the river at Portishead the Midlands firm of Messrs. W. H. Keys, Ltd., manufacturers of road-spraying material, have taken a lease of a large area of land for the purpose of installing plant for the manufacture of their special products. This new enterprise will also have a beneficial effect on the tonnage returns of the port.

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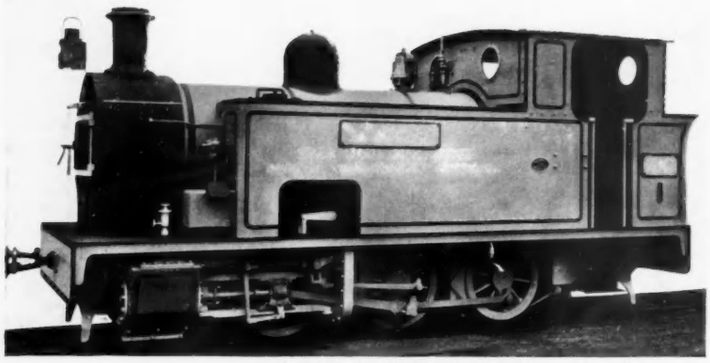

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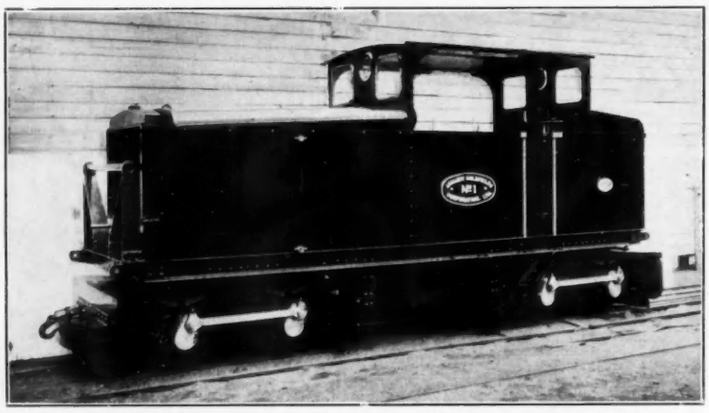

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Scottish Harbour Notes

King William Dock, Dundee, to be closed.

IT is expected that on an early date Dundee Harbour Trustees will make a definite move regarding the closing of the King William Dock, powers concerning which were conferred on the Trustees when their recent provisional order received Royal Assent. It is understood that consideration will be given to a proposal to close only the western portion of the dock meantime. This would permit of access to the West Graving Dock and also provide berths for sand boats which could not be easily accommodated elsewhere. The western section of the dock (stretching from the Royal Arch to a point opposite the lockway) is used chiefly as a lay-up for sprat yawls, pleasure yachts, and motor boats. Should the filling in of the basin be undertaken a valuable central site will be available for sale or lease.

Leith Dock Commission.

In the course of a report by the Edinburgh Corporation representatives on the Leith Dock Commission, reference is made to the coming into existence of a body calling itself the Leith Docks Development Association, and it is noted that this body has been urging in the local press that extensions should be made at the docks and that overtures have been made to the Town Council accordingly. The report emphasises the facts, however, that many of the ships frequenting the dock run more than half empty, and that there is not sufficient trade to warrant launching out on any large scheme; consequently, the Commissioners have hitherto concentrated on developing their existing facilities. "It has been urged," the report proceeds, "that the Leith Docks cannot accommodate the modern large cargo liner. The Commissioners, however, have yet to learn of a case where a ship desired to come to Leith and could not be taken in. The trade is largely with the adjoining Continental countries, and the ships using the port are of a size which (in the opinion of their owners) is suited for that trade. So far as can be seen the larger type of ship will never come to Leith; there is not a population large enough to consume the commodities which these can carry. Nevertheless, should the future prove otherwise the Commissioners have plans for extensions which could be started immediately, but meantime they do not consider it wise to spend probably £2,000,000 to accommodate traffic which is non-existent."

Dundee Harbour Trustees.

It is stated that an arrangement has been reached between a well-known firm of Forfar contractors (Messrs. D. Callander) and Dundee Harbour Trustees whereby the former will pay a penny a ton on all cargoes of stone chips shipped through the port; while Messrs. Callander, in return will be granted the use of the King George Wharf electric cranes whenever practicable, although the arrangement carries no guarantee. It appears that the port's facilities for loading stone chips has been the subject of lengthy discussion between the two parties. The shippers' difficulty is that they cannot load by chute for three hours before or three hours after high water, the deck of the boat being level with or above the quay. Two schemes for overcoming the difficulty have been shelved—the first being a ramp which the Trustees proposed to erect at the Eastern Wharf, and the second being a belt conveyer which Messrs. Callander received permission to build at their own cost at King George Wharf. The Trustees' permission with regard to the latter was withdrawn following a protest by two other quarry masters who complained that a privately-owned conveyor would mean that one firm would practically have a monopoly. By the new arrangement the Trustees will give vessels loading chips a crane berth whenever possible, and the cranes will be used only when the state of the tide prohibits the operation of chutes.

Proposed repairs at Stonehaven Harbour.

Stonehaven Harbour Board has discussed the plans and specifications of the proposed repairs at the local harbour which are estimated to cost £1,400, and it has been decided that the attention of the engineers should be directed to the necessity of using steel piling. At a recently-held meeting of the Board a letter was submitted from Messrs Henderson and Nicol (Engineers) with a copy of the plans and specifications in connection with the work in order to expedite matters. These had been before the engineer for the Fishery Board who had unofficially given his approval, and it would be for the Trust to send them to the Fishery Board for their official approval; and the engineers thought there would be no objections to the work being proceeded with at once. It was reported that the total estimate amounted to £1,400, but the engineers indicated that the cost might be considerably under that figure and strongly recommended that the work should be carried out by direct labour. It was finally decided to intimate that the Harbour Trustees believed it was necessary that steel piles should be used, and, if the engineers did not consider it necessary, they could meet the Trustees and state their reasons; then the Board would decide the matter.

Repairs at Arbroath.

Taking advantage of the low tides experienced at this period of the year workmen have recently been engaged in executing extensive repairs at a part of the Fish Quay of the tidal harbour at Arbroath. A crevice was noticed in the stonework some distance below high-water mark, and, to prevent more serious damage to the foundations of the quay, the first available opportunity of repairing and strengthening the structure was taken. Owing to the difficulty of carrying out such work in the vicinity of water a considerable portion of the quay has had to be removed. The aperture in the masonry was almost 6-ft. in depth into the wall and had an outward width of about 4-ft. To reinforce the quay, piles are being driven into the foundations and embodied in the rebuilding of the wall.

The Port of London Authority

London's Shipping.

During the week ended July 28th, 1,139 vessels, representing 1,018,278 net register tons, exclusive of those in ballast, used the Port of London. 567 vessels (894,494 net register tons) were to and from Empire and Foreign ports, and 572 vessels (168,784 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended August 4th, 949 vessels, representing 1,015,121 net register tons, exclusive of those in ballast, used the Port of London. 546 vessels (838,274 net register tons) were to and from Empire and Foreign ports, and 403 vessels (176,847 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended August 11th, 1,467 vessels, representing 1,197,439 net register tons, exclusive of those in ballast, used the Port of London. 574 vessels (842,481 net register tons) were to and from Empire and Foreign ports, and 893 vessels (354,958 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended August 18th, 1,175 vessels, representing 1,045,236 net register tons, exclusive of those in ballast, used the Port of London. 538 vessels (820,389 net register tons) were to and from Empire and Foreign ports, and 637 vessels (224,847 net register tons) were engaged in coastwise traffic.

During the week ended August 25th, 1,069 vessels, representing 1,023,722 net register tons, used the Port of London. 553 vessels (849,360 net register tons) were to and from Empire and Foreign ports, and 516 vessels (174,362 net register tons) were engaged in coastwise traffic.

Record Month at Tilbury Passenger Landing Stage.

More vessels and passengers were dealt with at the Tilbury Passenger Landing Stage during July than in any previous month. No fewer than 74 vessels, totalling 845,477 gross register tons, used the Landing Stage and altogether 21,366 passengers were embarked or disembarked, in addition to baggage and mails.

Immingham Dock Statistics.

During the month of July a total of 131 vessels, representing a net registered tonnage of 243,634, used Immingham Dock, including 24 vessels totalling 28,564 net registered tons using the Western Jetty coaling berth and 9 vessels of 100,683 n.r.t. engaged on passenger cruises, as compared with July, 1932, when 134 vessels totalling 235,216 net registered tons used the port, including 31 vessels totalling 40,435 net registered tons using the Western Jetty, and 7 vessels of 74,211 n.r.t. engaged on passenger cruises.

Port of Southampton Topics

Statistics for first half-year prove satisfactory.

STATISTICS for Southampton Docks for the first six months of 1933 indicate that the port has weathered the economic storm in a highly satisfactory manner.

During the half-year under review the number of vessels inward dropped from 1,496 to 1,375, whilst outward there was a decrease from 1,502 to 1,382—a total drop of 241. But the decline in the number of ships did not bring about a fall in the tonnage returns. On the contrary there was a sweeping increase, this being no doubt largely accounted for by the decision of the North German Lloyd, the Hamburg America Line, and the United States Lines to send their express vessels engaged on the New York service to the docks instead of embarking passengers in Cowes Roads or off Fawley.

In this connection it will be recalled that the Southern Railway Company introduced in the spring new berthing dues at the rate of 1½d. per net registered ton for vessels remaining docked for not longer than three hours.

Whatever may be the explanation to account for the increase, however, the fact remains that the inward gross total jumped from 6,476,214 tons to 7,421,250 tons and the outward figure from 6,576,845 tons to 7,492,818 tons. These yield an inward balance of 945,036 tons gross and outward of 915,973 tons gross.

The net figures show a similarly gratifying rise. Inward the total advanced from 3,418,594 tons net to 3,917,491 tons, and outward from 3,475,965 to 3,956,051. The respective increases were therefore 498,897 tons inward and 480,086 tons outward.

The volume of freight handled showed only a slight fall as compared with the corresponding six months of 1932, for although there was a drop of 17,267 tons in imports this was to some extent counter-balanced by an increase of 5,885 tons in exports. The totals for the past half-year were: Imports 235,636 tons, exports 164,074.

The most astonishing feature of the statistics is the large increase in the volume of passenger traffic, there being considerable increases both inward and outward. Since the travel situation on the North Atlantic has been so depressing it must be assumed that the advance is due entirely to the popularity of holiday cruising in large liners. Southampton has been particularly favoured as a port for the commencement and termination of such trips, but it was hardly expected that the cruise passengers would make good the slump in the numbers from the other side of the Atlantic. Inward the total for the six months amounted to 86,810, an advance of 4,127 as compared with the corresponding period of last year, and outward the total was 77,083, an increase of 4,036.

The number of troops through the port also showed an increase of 1,223.

Statistics for July show increases.

The July figures also contain satisfactory features. Particularly in regard to cargo do they make good reading, for inward there was an increase of 10,177 tons, the figure rising from 51,290 tons in July, 1932, to 61,467, and outward from 25,869 tons to 28,834, an increase of 2,965 tons.

There was a slight fall in the number of vessels using the port, the totals of 321 inward and 321 outward showing decreases of 12 and 19 respectively compared with last July. The gross tonnage returns, however, showed an increase of 181,172 tons inward and 70,594 tons outward, the totals being 1,802,573 tons inward and 1,803,321 tons outward.

The net tonnage figures tell a similar tale, for inward the total rose by 81,696 tons to 944,311, and outward the total rose by 19,679 tons to 940,816 tons.

The passenger figures were down a little, the inward total falling from 39,182 to 38,293 and the outward total from 47,457 to 40,646, the total decrease being 7,700. The decreases are accounted for by the fact that this year the Bank Holiday traffic fell in August instead of at the end of July.

The Limmer and Trinidad Lake Asphalt Co., Ltd.

The above firm have recently issued a very well produced brochure on the subject of lithocrete deck covering, and in which they point out the many advantages and uses of lithocrete.

Lithocrete is used extensively in the construction of modern vessels and can also be used on decks, tank tops, alleyways, holds, sports decks, refrigerated spaces, promenades, etc., etc., and owing to its hard-wearing quality, it has proved a very good substitute for wood, especially where a hard-wearing surface is required.

Lithocrete, owing to its impervious nature, can also be laid in positions which are constantly under water, whilst as it is a jointless type of surfacing, there can be no danger of percolation, and it also withstands the action of acids and salt water.

Any of our readers who are desirous of obtaining further particulars of Lithocrete or a copy of this brochure can do so on application to The Limmer and Trinidad Lake Asphalt Co., Ltd., Artillery House, Westminster, London, S.W.1.

Weddell's Sounding Machine.

Messrs. George Russell and Co., Ltd., of Motherwell, Scotland, who are the manufacturers of the Weddell Sounding Machine, have during the course of the past year made considerable improvements to this machine.

This sounding machine, as previously manufactured, weighed 55 lbs. and the first consideration of the manufacturers has been to reduce this weight and therefore to make it easier for the purposes of carrying from place to place.

This reduction has been effected by replacing the cast iron casings with those made from non-corrosive silicon aluminium alloy, and this has resulted in the weight being reduced to 33 lbs., a reduction of approximately 40 per cent., and the machine also now has a more pleasing appearance.

Improvements have also been made to the mechanical rope guide, which in the old machine was worked by a star wheel arrangement and was very noisy in action. This method gave fairly satisfactory results in water, but could not stand a gravity drop test through air. In the new machine this guide is driven by machine cut gearing enclosed within the main casing and under test the weight can now be dropped by gravity through 25-ft. and pulled up by the very effective hand brake which operates directly on the barrel in a matter of a further 2-ft. or so, without the least jar or noise. This test is a very strenous one, and one that is not likely to be met with under actual working conditions. The hood is now cored out in six places instead of two, so that the rope can be seen coiling on to the barrel without difficulty.

Another improvement is the addition of a folding leg to support the machine in upright position when not in use.

These improvements can be incorporated into Weddell's Sounding Machines which have been supplied since 1928.

Further particulars of these improvements and also of the Weddell's Sounding Machine can be obtained on application to Messrs. George Russell and Co., Ltd., Alpha Works, Motherwell, Scotland.

Shipping at Swedish Ports in 1932.

The Swedish Board of Trade has recently published a statement of the traffic at various ports in the country. Including the three free ports of Stockholm, Gothenburg, and Malmo, 271 ports are open to general trade, and of these 158 have the right of charging harbour dues.

The total tonnage entered and cleared in 1932 exceeded 1,000,000 at only nine ports, excluding the free port of Gothenburg (with a traffic of 2,939,000 tons), and that of Stockholm (with a traffic of 1,461,000 tons). At most ports entries and clearances were smaller than in 1931; the total foreign shipping traffic of the country diminished by 8.5 per cent., and the decrease in coastwise trade is estimated at about 12 per cent., though precise figures are not available. At the most important ports, the total of entries and clearances in 1931 and 1932 was as follows, viz. :—

	1931 Thousand tons.	1932 Thousand tons.
Gothenburg	11,342	11,044
Stockholm	9,909	9,065
Malmo	6,941	7,159
Halsingborg	4,911	5,462
Tralleborg	4,305	3,445
Gavle	1,751	1,724
Norrkoping	1,787	1,683
Kalmar	1,563	1,335
Landskrona	1,339	1,271

The changes in the shipping returns from Halsingborg and Tralleborg are largely due to fluctuations in the rail ferry traffic with Denmark and Germany respectively.

As regards trade at the smaller ports, it is to be noted that at Lulea traffic fell from 1,245,000 tons in 1931 to 648,000 tons in 1932, as a result of the stagnation in iron ore exports. Other ports on the Northern Baltic interested in the timber and wood-pulp trade such as Sundsvall, Soderhamn, Umea, and Harnosand also showed a considerable falling off; Ornskoldsvik, where trade had declined in 1931, recorded a recovery last year.

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VAR GOD ARE ROPA "THE DOCK AND HARBOUR AUTHORITY" NAR ANNONSORERNA TILLSKRIFVAS.

Clyde Navigation Trust

New Industry to the Clyde

WELCOME news was contained in the announcement made at the August monthly meeting of the Clyde Navigation Trustees that a new industry was to be established on the Clyde, and that the Clyde Trust had negotiated for the lease of a site extending to 6,114 square yards on their ground situated at the west side of the outer basin of Rothesay Dock to The Tunnel Portland Cement Co., London, for the construction of a works for the manufacturing of cement. It is anticipated that when completed the works will give employment to a considerable number of men in Clydebank, where Rothesay Dock is situated. Already preparations are in hand for the construction of the works. The contract for the piling work, it is understood, has been given to Messrs. Melville, Dundas and Whitson, Ltd., and for the constructional steel work and cranes to Messrs. Sir William Arrol and Co., Ltd., and it is anticipated that the factory will be ready for production before the end of the year. The plant and machinery to be installed will be of the latest and most efficient design. Before deciding on the site now taken from the Clyde Trust, it is understood that the Tunnel Portland Cement Co. examined a number of other sites in various parts of Britain and decided in favour of the Clyde Trust's property in view of the excellent facilities the site offers for transport by water, rail and road.

Developing Empire Trade: Important Visitors to Glasgow.

Important steps have been taken during the past month in connection with the Clyde Trust policy of developing trade between the various dominions of the Empire and Scotland through the port and markets of Glasgow.

Prominent among a large number of overseas visitors, who, at the invitation of the Clyde Navigation Trust, have been investigating with Mr. Harold M. Ford, the Commercial Manager, trade conditions with a view to opening up and developing business in their various primary products with Glasgow, have been Mr. L. C. Le Roux, Chairman of the Perishable Products Board of the Union of South Africa, and Mr. C. A. Smith, Shipping Manager of the South African Railways, accompanied by Mr. J. H. Dimond, South African Trade Commissioner in London, and Mr. B. W. Harlow, Overseas Representative of the South African Co-operative Citrus Exchange, Ltd.

For the past three years efforts have been made by the Clyde Trust to open up a direct trade with the South African Fruit Industry and the traders of Glasgow by means of a regular programme of direct sailings to the port. Mr. Ford, the Commercial Manager, who has had this matter in hand on behalf of the Clyde Trust, has repeatedly urged on all concerned the opportunities which are being missed in the non-development of the Scottish market in South African fruits, and, backed up by the traders and merchants in Glasgow, who are keen to develop this trade, has had many meetings and conferences with representatives of the South African Government and others interested in London during the past year. The visit of the chairman of the Perishable Products Board and the Shipping Manager of their railways has now carried the matter a step further, and during their investigations they were urged by all concerned to build up the Scottish market with a regular itinerary of vessels, in conjunction with Liverpool, in preference to the uneconomic and wasteful methods now employed of attempting to do so through distribution from Southampton, with attendant heavy costs in transportation. Their investigations included meetings with a large number of traders operating on the Glasgow markets, an inspection of the markets and their facilities and an inspection of the docks. The visitors were also entertained to luncheon by the Lord Provost of Glasgow and by the Clyde Trustees.

At the luncheon at the City Chambers, the Lord Provost, Mr. A. B. Swan, who is taking a keen interest in all questions affecting Empire trade development, referred at the outset to the friendly trading relations which existed between the Union of South Africa and the Port of Glasgow. He hoped that the visit of Mr. Le Roux and his associates to Glasgow would be profitable both for South Africa and for Glasgow. They represented a country, one of the main products of which was fruit. We could not grow that fruit in this country, but we could consume it. The visitors, he said, were particularly anxious to help the producers of that fruit. He (the Lord Provost) was concerned with two classes—the producers and the consumers. Unless they could economically produce the fruit and dispose of the products to the material advantage of the people of South Africa, then that industry would ultimately die.

In Glasgow there was a fine outlet for the produce of South Africa. It had a port which was second to none, and which had every facility for the handling of cargo. Glasgow had really a consuming population of something like 6,000,000 or 7,000,000, because it distributed supplies to the whole of Scotland and the whole of Northern Ireland, and it was a good competitor for the North of England.

The produce of South Africa at the moment was not getting a fair chance in the markets of Glasgow.

They could not expect merchants to build up a business unless they could be assured of regular supplies of foodstuffs in prime condition.

Producers under a Handicap.

Glasgow and the West of Scotland was the largest fruit-growing district in the whole of Great Britain. It was essential, therefore, that they should have their supplies in prime condition. At the present time South Africa was delivering cargoes to Southampton and from there to London, and what occurred was that the surplus of these cargoes found its way to Glasgow. In these circumstances it could not be expected that consignments reaching Glasgow could be in the same condition as if they were shipped direct to the port.

It had been said that Glasgow was not a good market so far as prices were concerned. Might he say, however, that the records for Glasgow showed that for fruit in prime condition it was the best, or at any rate equal to the best of any market in this country, and that the prices obtained there were equal to the best that could be obtained anywhere.

Pointing out that South Africa had derived certain benefits from the Ottawa Conference, the Lord Provost said it seemed to him that these benefits were being largely wasted so far as the producer was concerned, because when the supplies arrived in the city there was an additional charge of from 1s. 9d. to 2s. per case as against the London market, due to the wasteful method of landing Glasgow's supplies at Southampton and railing them 500 miles to Glasgow. That was putting the producer under a serious handicap. In Glasgow the people were waiting anxiously to give the producers in South Africa the benefit of their consumption.

Development of Direct Trade.

Referring to statistics showing the development in the direct importation of fruit to the city, the Lord Provost instanced the Jaffa orange trade. Ten years ago, he said, the importation of these oranges amounted to something like 10,000 cases, while to-day it had increased to 500,000 cases. The direct shipment of Australian fruit, which was practically non-existent four years ago, amounted to 250,000 cases. This had not been achieved by discharging at a port situated the other end of the country but by a proper system of regular and direct shipment to Glasgow. That position showed that there was room in the Glasgow market for South African fruit products. They were not looking for cheap produce in Glasgow, but they wished to benefit and take their full share in Empire trade. That was the feeling throughout Scotland generally. If South African producers linked Liverpool along with Glasgow, then they would be supplying an area, not only embracing 7,000,000 inhabitants, but something like 40 per cent. of the population of Great Britain. If the producer was protected, the consumer would derive the best advantages. To-day, when the World Economic Conference had practically failed, let us say that the Empire would not fail, but that it would take advantage of all the natural resources within it for the good of each and every partner.

Growth of Industry.

Mr. Le Roux replying, said that Scotland and South Africa had many things in common. Scotland had sent out to South Africa many of her sons who had done great work in developing that country in the field of commerce, in law, in medicine and in religion.

The agricultural productions of South Africa had developed very rapidly during the post-war period. Their main product, of course, was wool, but during the last 15 years the production of fruit, and particularly of citrus, had become a big factor in their national life. During the last five years they could double their output of that fruit, and during the next five years they could double that again, provided they could find an adequate outlet. They felt that the time was opportune to look for a wider field of distribution in Great Britain, and they felt the need for direct distribution to the various ports.

Ottawa Advantages.

If in the past they had not fed the different ports directly it was not through any lack of desire, and certainly not through any lack of advice.

Clyde Navigation Trust—continued

They hoped to overcome the difficulties, and also that the time was not far distant when they would see ships coming in from South Africa at more regular periods. It was their desire to get to the different markets through their natural ports.

The advantages secured at Ottawa were all to the good, but they were not of sufficient magnitude to give them a definite advantage over their competitors. They were thrown back to a large extent on Empire sentiment, but he would appeal to those engaged in the trade to do what they could to give effect to the spirit of Ottawa.

Presiding at the luncheon at the Clyde Trust Chambers the following day, Mr. William Cuthbert, vice-chairman, said that the Clyde Trust had been very happy that this visit should have come under their auspices, and they hoped that the results of the investigations into the possibilities of trade with Glasgow would result to the mutual benefit of South African producers, the City of Glasgow and the Clyde Trust.

The Clyde Trust, through their Commercial Department, had been taking an active interest in the development of trade between the two countries for the last two or three years, and they were confident that if only arrangements were made for South African trade to come direct to the Clyde trade would rapidly reach much larger dimensions. Under present conditions Glasgow was very seriously handicapped through not having regular and direct shipments, and he hoped that the investigations now in hand would result in a definite programme of direct steamers to Glasgow next season.

So far as the port was concerned, it had every facility for the rapid handling, discharge and economic distribution of fruit from the docks, and he believed he was right in saying that the charges operative at the port were lower than those at any of the other principal ports of the country.

Replying, Mr. Le Roux said that to-day South Africa, like other parts of the Empire, was experiencing the crying need for new markets. Within the last 10 or 15 years there had been a phenomenal growth in South African production. Some 20 years ago the demand for their products in this country was negligible. At the present time the volume of both production and demand had become such that they were absolutely compelled to find new outlets. He and his colleagues would like to see the Port of Glasgow served in the most economical way in order to develop the Glasgow markets. There had been difficulties in bring this about, but he was confident that they would be surmounted and he was quite convinced that the time had now arrived when South Africa could and should send steamers direct to the markets of Liverpool and Glasgow, and he could assure them of their desire to decentralise their marketing supplies, and hoped that next year might see the successful inauguration of a direct shipment programme to the port.

Mr. Le Roux concluded by thanking the Clyde Trust for the great interest which they were evincing in the important question of developing trade between South Africa and Scotland, and also with the arrangements which had been made and the facilities which had been placed at their disposal.

Visitors from Australia.

Another important visit has been undertaken by Mr. A. W. Fairley, Chairman of the Shepparton Fruit Preserving Co., of Australia—the largest fruit cannery in that Dominion, and a member of the Australian Canned Fruits Board, accompanied by Mr. W. J. Adams, Secretary of the Australian Canned Fruits Board, from Melbourne, who, with Mr. Ford of the Clyde Trust, have been investigating the possibility of developing trade in Australian Canned Fruits with Scotland.

In a subsequent interview, Mr. Fairley said that their visit to Glasgow had far exceeded their expectations, and they had had their eyes opened to the tremendous possibilities for a large development of trade in Australian canned fruits. To-day Australia was canning no less than 2,300,000 cases of fruits, produced by thousands of growers—a large number of whom were Scottish settlers. Despite enormous difficulties in the past, which had now been overcome, the industry was now on its feet and giving increasing employment in Australia. Its production was yearly increasing and capable of an enormous development in the future, but this naturally depended upon finding new markets in this country. He had had his eyes opened to the enormous possibilities for development of trade with Scotland not only with canned fruits but other primary products, and he was hopeful that the arrangements now being made for better marketing of supplies in the next year or two would see a considerable expansion in their trade with Scotland direct, through the Port of Glasgow.

Cattle and Meat from Rhodesia.

A further visitor to the Clyde Trust has been Dr. A. E. Romyn, of the Department of Agriculture, Rhodesia, who, on behalf of the Rhodesian Government, has been examining the possibility of developing trade in live cattle from Rhodesia with Glasgow, and also the export and opening up of trade in meat with the Glasgow Meat Market.

Dr. Romyn visited and inspected the cattle lairages owned by the Clyde Navigation Trust, where he inspected both Canadian and Irish cattle and witnessed a weekly sale. A visit was also made to the Corporation Meat Market, where discussions took place with various traders regarding tentative arrangements for the marketing of Rhodesian meat in Glasgow.

A number of other important visitors from New Zealand, Australia, South Africa and Canada have also been in Glasgow conferring with the Commercial Manager of the Clyde Trust, regarding future developments of trade in primary products with their respective Dominions.

The Port of Amsterdam

The position of the Port of Amsterdam can be seen from the following figures in regard to number of vessels and tonnage and to goods traffic arrived and sailed, as compared with the corresponding figures of last year.

SEAGOING VESSELS AND TONNAGE.

		ARRIVALS				SAILINGS			
		No.	Per Cent.	N.R.T.	Per Cent.	No.	Per Cent.	N.R.T.	Per Cent.
July	1932	289		409,159		288		396,193	
,,	1933	289		390,350		302		429,860	
		0	0	—18,809	—4·6	+14	+4·86	+33,667	+8·5
June	1933	287		392,119		274		380,087	
July	1933	289		390,350		302		429,860	
		+2	+0·7	—1,769	—0·45	+28	+10·22	+49,773	+13·09
Jan.-July	1932	1,946		2,838,790		1,944		2,834,805	
,,	1933	1,878		2,644,040		1,890		2,713,470	
		—68	—3·49	—194,750	—6·86	—54	—2·78	—121,335	—4·28

SEAGOING GOODS TRAFFIC
(In Tons of 1000 Kilos*).

			1 Import	2 Transit incl. in col. 1	3 Export	4 Transit incl. in col. 3	5 Total col. 1 & 3
June	1932	...	297,175	55,234	121,229	36,387	418,404
,,	1933	...	222,303	58,734	110,233	53,693	332,536
			—74,872	+3,500	—10,996	+17,306	—85,868
			—25·19%	+6·34%	—9·07%	+47·56%	—20·52%
May	1933	...	289,611	49,419	115,183	44,249	404,794
June	1933	...	222,303	58,734	110,233	53,693	332,536
			—67,308	+9,315	—4,950	+9,444	—72,258
			—23·24%	+18·85%	—4·30%	+21·34%	—17·85%
Jan./June	1932	...	1,776,925	312,497	759,342	201,447	2,536,317
,,	1933	...	1,626,055	343,357	742,805	278,177	2,368,860
			—150,920	+30,860	—16,537	+76,730	—167,457
			—8·49%	+9·86%	—2·18%	+38·09%	—6·60%

*These figures have been taken from the monthly statistics of the Central Bureau, The Hague, Holland.

Classified according to flag, the number of vessels which entered the Port of Amsterdam during July was:—Dutch, 130; Great Britain, 59; German 31, Swedish, 26; Norwegian 16; Danish 2; American, 2; French, 1; Greek, 2; Spanish, 1; Lettish, 5; Finnish, 3; Polish, 1; Esthonian, 6; Belgian, 1; Jugo-Slavian, 1; Dantzic, 1; Lithuanian, 1.

Vessels laid up at Amsterdam:—1st July, 1933, 30 vessels, measuring 145,621 tons gross; 1st August, 1933, 30 vessels, measuring 131,397 tons gross (1st August, 1932, 66 vessels, measuring 332,497 tons gross).

Harbour Traffic in Brake during June Quarter, 1933.

Incoming altogether 343 (535) vessels with 71,039 (127,238) net registered tons, arrived in Brake in seagoing and river traffic. Of these 331 (50) were German with 51,064 (75,779), and 11 (34-) foreign with 19,975 (51,444) net registered tons; 139 (138) with 48,021 (72,133) n.r.t. were with cargo, 203 (397) with 23,018 (55,090) n.r.t., were in ballast.

337 (525) vessels with 71,253 (123,252) net registered tons sailed. Of these 326 (492) with 51,278 (74,431) net registered tons were German, 11 (33) with 19,975 (48,821) net registered tons were foreign; 217 (435) with 26,807 (65,160) net registered tons were with cargo and 120 (90) with 44,446 (58,092) tons were in ballast.

Total turnover incoming amounted to 39,951 (117,186) tons, outgoing 18,020 (63,597) tons, altogether 57,971 (180,783) tons, showing, therefore, against the second quarter, of 1932, the catastrophic decrease of 122,812 tons or 68 per cent.

Figures in brackets show the traffic during the previous quarter.

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